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The Public Lighting Tables of the American Meter Company will be found in the page advertisement of that Company.

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[OFFICIAL NOTICE.]

Wrinkle Department, Western Gas Association.

WESTERN GAS ASSOCIATION, OFFICE OF THE SECRETARY,
NEW ALBANY, IND., Jan. 16, 1899.

To the Members of the Western Gas Association:

Mr. E. H. Jenkins, Editor of the Wrinkle Department, desires it known that those who have contributions to offer for publication in this valuable division of the Association's proceedings, should forward the same at as early a date as possible. All matter of this nature should be in hand not later than April 1st. Let no member fail to mail Mr. Jenkins a description of any device that saves labor or insures through its use better service in the production or distribution of gas.

Address all communications to Mr. E. H. Jenkins, Engineer Buffalo City Gas Company, Buffalo, N. Y.

J. W. DUNBAR, Secretary.

BRIEFLY TOLD.

ANNUAL MEETING OF THE SOUTHWESTERN GAS, ELECTRIC AND STREET RAILWAY ASSOCIATION.—Mr. E. L. Wells, Jr., Secretary of the Southwestern Gas, Electric and Street Railway Association, informs us that the next convention of the Association will be held in Austin, Tex., commencing April 19th. The President of the Association (Mr. Carl F. Drake, Austin, Tex.), and its First and Third Vice-Presidents (Mr. J. H. Fitzgerald, of Houston, Tex., and Mr. W. H. Weiss, of San Antonio, Tex.), are well and favorably known to the gas interests of the Southwest, as also is its Treasurer, Mr. Fred. Fries, of San Antonio. Under the circumstances, although the title of the Association is rather extra comprehensive, one may take for granted that the gaseous division of its ministrations will not be neglected. In fact, the programme so far arranged shows that the light of the present will illuminate the proceedings decidedly, so far as the paper list is concerned. This programme will be given in the JOURNAL for April 9th. Meanwhile Secretary Wells asks us to say that any information he can give respecting the convention and its purposes will be gladly furnished. Communications to him should be addressed, "E. L. Wells, Jr., Secretary, Marshall, Tex."

SPECIAL EDITORIAL CORRESPONDENCE—FIRST ANNUAL MEETING, KANSAS GAS, WATER AND ELECTRIC LIGHT ASSOCIATION.—Our special correspondent, writing from Leavenworth, Kas., under date of the 18th inst., describing the first annual meeting of the Kansas Association, says:

If you had raked "Sunny Kansas" over with a fine-tooth comb it would have been a difficult matter to assemble a body of men who have been forced to listen to more "tales of woe," or, in the vernacular of the day, to more "hard-luck" stories, in their everyday existence, than that body of representatives who greeted each other in the parlors of the National Hotel, Topeka, Kas., on the occasion of the first annual meeting of the Kansas Gas, Water and Electric Light Association, held March 15th and 16th. The general supposition that managers in this section of gas, water and electric light plants are wholly without friends, due to the peculiar nature of their business, is completely shattered—in fact, rent asunder—for the Kansas representatives had at least one staunch friend, tried and found true. This friend developed in the "weather man," who is supposed to control the action of the elements

in the Sunflower State. Perhaps his mindfulness of the weather conditions was prompted by the fear of having his gas service discontinued or his water supply shut off; but in whatever event was the reason, he exceeded our most sanguine expectations, for the days of themselves were all that could be desired. The meeting proved a decidedly beneficial one to each and every member present, the interest in the proceedings never lagging for an instant. Every delegate appeared to constitute himself a committee of one to make the sessions all the more entertaining to his associates. The Association, although in its earliest infancy, is in a pronouncedly healthy condition, having a membership of 29, who represent 30 different plants throughout the State. The proceedings were commenced at 3 P.M. of March 15th, at which time the President (Mr. L. T. Palmer, Leavenworth) called for the regular order. Secretary Foley's call of the roll disclosed the presence of the following delegates:

Bailey, Prof. E. H. S., Univ. of Kansas.	Palmer, L. T., Leavenworth.
Cowdrey, R. E., Topeka.	Pollock, J. W., Ottawa.
Foley, J. H., Leavenworth.	Purdy, A. H., Topeka.
Hopper, G. E., Arkansas City.	Rodgers, A. T., Beloit.
Johnston, R. E., Lawrence.	Seabury, W. G., Pittsburg.
Maunsell, C. R., Topeka.	Shaw, J., Topeka.
Morgan, H. S., Topeka.	Tracy, W., Salina.
Nicholson, J. D., Newton.	Wills, E. S., Atchison.
	Wing, G. B., Kansas City.

President Palmer read his Address, which, although brief, was to the point. In calling attention to the object of the meeting he remarked that as the members were there for the bettering of the industry they represented, he hoped, in fact, knew, that each present would do his share towards making the meeting successful, in that its experiences would benefit themselves and the companies they represented. Secretary Foley's minutes of the initial meeting having been approved, the following were elected to membership: Geo. H. Crouse, Supt. Wellington Water Co.; Jno. N. Hodges, Supt. Pittsburg Gas Co.; Northrup Moore, Supt. Wyandotte Gas Co., Kansas City, Kas.; C. T. Wisler, Supt. Junction City Water Co. Mr. Geo. B. Wing, President of the Executive Committee, presented an annual report which showed that the Association's affairs were in good shape. Prof. Bailey, of the Kansas State University, then entertained the Association with an excellent address on topics relating to gas and water supply. On motion, the invitation of Mr. Northrup Moore, that the Association hold its next meeting in Kansas City, Kas., was accepted. On motion of Mr. Geo. E. Hopper, the time of the meeting was referred to the Executive Committee, with the understanding that the date thereof should be not earlier than November 1st nor later than November 15th, 1899. A resolution was adopted that all papers prepared for a meeting should be handed to the Secretary at least one month in advance of such meeting; and it was further agreed that the Secretary should appoint a committee of three whose duty should be the preparation of arguments for and against the points made by the authors of papers. The report of the Secretary and Treasurer having been disposed of, Mr. L. T. Palmer read an interesting paper entitled "A Desirable Increase and How to Obtain It." In it he showed the advantages of looking for business by gas companies' representatives at all times and in all places. Mr. Northrup Moore next related his experiences as a gas company manager, his argument (in the shape of a paper bearing the caption "Benefits of Soliciting,") completely bearing out Mr. Palmer's arguments. This concluded the first session, an adjournment being ordered to 7 P.M. The evening session was opened in the considering of the paper by Mr. R. C. Johnston, of Lawrence, whose instructive communication dealt with "Gas, Water and Electric Companies and Their Relations to the Public." Prof. Bailey followed with a clear exposition of the advantages of gas fuel over solid fuel, and predicted that the time was near when the latter would be displaced by the former in the territory represented by the Association. Mr. C. R. Maunsell (Topeka) read a paper[1] on "Standard Charges for Electric Current," in which he unqualifiedly favored the meter system, to the complete discouragement of the flat rate plan. The second day's proceedings (9.30 A.M., the 16th inst.) were initiated by an interesting recital from Mr. C. E. Wills, of Atcheson, who detailed a court experience so far gained, in connection with a suit for damages over the death of a boy by drowning in the reservoir of the Atchison water works. Next in order was the paper, by Mr. George E. Hopper, of Arkansas City, on "A 2,000 foot Siphon with Tube Wells Attached." The paper was well put together and it brought out a good discussion. Mr. John F. Schaefer, representing the General Electric Company (he was present as a guest of the Association) here spoke most entertainingly on matters pertaining to the electric industry. Next in sequence was a recital, by Mr. C. T. Wisler, of troubles experienced by him in the instance of water hammer at Junction City. The burden of his plaint was for knowledge which would enable him to end the hammering; and perhaps the best reply regarding the trouble was made by Secretary Foley, who admitted that he had been beset by water hammer in his time and experience. The Question Box was then opened and its contents debated, much to the advantage of the members. The following invitations were read and accepted with thanks: From Mr. Jesse Shaw, Superintendent of the Topeka Water Works, to inspect the plant, particularly as to its pumping station; from Mr. R. E. Cowdrey, Superintendent of the Excelsior Coke and Gas Company, to look over the plant, and with an especial view of inspecting the new holder which is about ready to be put in service; and from Mr. C. R. Maunsell, to inspect the plant of the Edison Electric and Illuminating Company of Topeka. A letter expressive of regret from Prof. Lucien J. Blake, of the Kansas State University, over his inability to attend the meeting was read, as was a telegram of a like nature from Mr. J. A. Bendure, of Atchison. Another telegram, which will bear reprinting, was this:

SPRINGFIELD, O., March 15, 1899.

J. H. Foley, Secretary, Topeka, Kas.—The Ohio Gas Light Association extends most cordial greetings to the new born.

E. H. JENKINS, Vice-President.
T. C. JONES, Secretary.

As many of the members had but limited time, and all were desirous of visiting the points of interest in the Capital City before returning to their homes, the meeting was declared adjourned at 11:30 A.M. I may add that the first annual meeting of the Association proves positively that the Association is sure to live and grow.

1. See page 411.

ADDING TO THE PERPLEXITIES OF THE BOSTON MESS IN GAS.—A correspondent incloses the following: BOSTON, March 22, 1899.

The Massachusetts Board of Gas and Electric Light Commissioners presented to the Legislature to-day their 14th annual report, embodying among their other usual curiosities one specially important—viz., a bill to recommend the compulsory consolidation of the gas companies in Boston, now under control of Mr. H. M. Whitney and the New England Gas and Coke Company; or, rather, more strictly speaking, two Commissioners, Messrs. Barker and Gifford, submit one, and General Schaff, dissenting, suggests a different one. This action is in accordance with the resolve of the Legislature of 1898, and is referred to by the Commission as desirable, since "these companies are to a large degree interdependent, and these complex and extraordinary relations afford abundant opportunity for confusing and concealing from the public their true relations and the facts about their actual profits." Briefly written, the majority bill is but a sketch in outline, having no settled capitalization plan—a fact which Gen. Schaff makes the basis of his dissent; but the agreement for consolidation shall determine the amount of the capital stock, bonds and coupon notes to be issued, subject to restrictions of chapter 450, of the Act of 1894, which refers all such matters to the Commissioners for final action. Noticeably also, the law relative to the Massachusetts Pipe Line Company is repealed only in the matter of the price over which there was such a contest when the bill was passed in 1896. Section II. is an attempt at a compulsory consolidation after —— months, under the threat of the Supreme Court, and as such can hardly be said to be compulsory; more evidently, a desire to test the spirit of the Legislature. Gen. Schaff's dissenting bill is singular also, in a triennial hearing to fix the price of gas in the city "As low as circumstances will admit." This is a new notion in Massachusetts, though not so much so elsewhere. As Mr. Whitney personally applied the torch to a stack of 50 ovens at the Everett works of the New England Gas and Coke Company this week it would seem that the fires there will begin to burn.—THE HUB.

NOTES.—The annual meeting of the Superintendents and Agents in the employ of the United Gas Improvement Company was most successfully brought off last week in Philadelphia—Tuesday, Wednesday and Thursday. The sessions were held in the Drexel Building, and headquarters were in the Hotel Walton, where a "Smoker" on Thursday evening brought the proceedings to a happy termination. A feature of the sessions was a visit on Wednesday afternoon to the U. G. I.'s mammoth manufacturing station at Point Breeze. Several interesting papers were read, notable of them being those by Mr. Rusby, of Jersey City, N. J., and by Mr. Northrup Moore, of Kansas City, Kas.——The proprietors of the Lancaster (Pa.) Gas Light and Fuel Company have voted to increase the par value of the shares to $50 from $25.——The proprietors of the Sing Sing (N. Y.) Gas Manufacturing Company have reduced the selling rate to $1.50 per 1,000, the reduction to date from May 1st.

PROCEEDINGS, FIFTEENTH ANNUAL MEETING, OHIO GAS LIGHT ASSOCIATION.

HELD IN COUNCIL CHAMBER, CITY HALL, SPRINGFIELD, OHIO, MARCH 15 AND 16, 1899.

FIRST DAY, MARCH 15, MORNING SESSION.

The Vice-President (Mr. E. H. Jenkins, Buffalo, N. Y.), having called the meeting to order at 11 A.M., thus

INTRODUCED THE ASSOCIATION'S HOST:

Gentlemen: I have the pleasure this morning of introducing to you a typical Ohioan and a representative gas man. A man who by his honesty and fair dealing—traits of character that always go with a good gas man—has earned the confidence not only of the citizens of Springfield but of the entire State of Ohio to such an extent that recently it gave them pleasure to elect him, by a handsome vote, to the highest office in the State. (Applause.) I believe the Ohio Gas Light Association owe its birth to such men as General Hickenlooper, Governor Bushnell, and Emerson McMillin, and we are all proud to number these men with our members.

I have the honor, as well as the pleasure, of presenting to you, as the representative of the city of Springfield, Governor Asa S. Bushnell, who will welcome you to this city. (Great applause.)

GOVERNOR BUSHNELL'S WELCOME.

Mr. President, and Members of the Ohio Gas Light Association: Through the courtesy of the committee on entertainment I am permitted the pleasure of giving you greeting and bidding you welcome to our city on this occasion. Fourteen years ago this month I had a like pleasure, and that was at a similar meeting of this Association. At that time, as a private citizen, and as the President of the Springfield Gas Light Company, I had the pleasure of welcoming you to the Champion City. If the committee had any idea of entertainment when they invited me to speak to you this morning, I can simply say that I am sorry for you. If, however, it was simply to bid you a cordial greeting and a hearty welcome, my greeting shall be as cordial and as affectionate as that of the maiden for her soldier lover returning from the war (applause), and as warm as the tropical sun of our new possessions. (Renewed applause.) To those of you who come from commonwealths beyond our border, I welcome you to this one—the noblest of them all (cheering); and to you who are fortunate enough to be citizens of our grand and beloved State of Ohio, I welcome you to our own. I came 50 miles to say this to you; but I would travel 1,000 miles at any time to meet such an Association of men as I see before me this morning. (Applause.) Representative men of one of the great industries of our country—certainly one of the grandest industries; for it is conducted for the purpose of furnishing light to those who are in darkness, a most noble calling and a most noble purpose. (Applause and laughter.)

I said 14 years ago that I hoped your meeting would be productive of good to yourselves personally and to the important interests you represent. I can think of nothing better than to repeat that statement this morning.

The definition of welcome is "To receive and entertain cordially and cheerfully." As Milton said:

"We thus salute you with our early song,
And wish you welcome, and wish you long." (Applause.)

Many changes have taken place since your last meeting in Springfield, and especially since the early one I referred to, the second meeting of your Association. Many of our companies have changed somewhat, but we are still ready to furnish, for a fair compensation, light, which certainly is as great a luxury as any other given us in this world.

Our country has prospered wonderfully during the last two or three decades. No other country upon the earth has made greater advancement and progress than this, our Nation, the United States of America. (Renewed applause.) And no greater changes have taken place, or more advancement as we believe been made during the past year.

A great army was organized and put in the field, and in 113 days one of the great powers of Europe was conquered, its navy destroyed, with the surrender of a portion of its territory, and the fact established that the navy of this country is the grandest navy that floats the seas (cheering); and the army the grandest army that ever shook the earth with its tread. (Renewed applause.) And now, while there is a division of opinion as to certain of the great problems that confront us as a nation, we are pledged morally, or the Government is pledged morally, to expansion; and we believe there will be such an exhibition of courage and conscience by the Congress of the United States that these questions will all be happily settled, and settled to the glory of the United States. (Applause and cheers.)

Many of us may have wished that the expansion should have been northward among an English speaking people, the Anglo-Saxon race, instead of 12,000 miles to the west of us, among an uncivilized and sullen people; but we believe that even those people, coming in contact with the Anglo-Saxon race, will in time become civilized by the United States establishing a government, until such time as they are able to control a government of their own. They will then be able to take their place among the nations of the earth and be a credit to their fellow men. We believe that that will be the course of the United States, and, as I said, the result will be for the glory of our Nation. There have been one or two grand results from the late war. One certainly is that the line between the North and the South has been blotted out, and that, for the common defense of our country, the blue and the gray marched side by side, touching elbows and under the grand old flag of the Union. (Renewed applause.) Another good result is that the feeling between the mother country and the United States is more kindly than it has ever been since the days of the revolution, and that the Englishman can feel whenever he meets an American that he is meeting a friend, though he may not be an ally; and the same feeling can exist with the American when he shall meet the Englishman. It is a source certainly of gratification to know that England has found out within the last year how important the United States is to her. We are certainly glad of this very kindly feeling. I met Lord Beresford in New York a few days ago, and he spoke in the very highest terms of America and Americans, and particularly of the American navy. Delighted with his travels and his reception throughout the United States, he said: "He was gratified at the feeling that now existed, and he hoped that it would continue for time to come."

I do not think there is anything which commands more respect from foreign countries than a strong army and a strong navy, and the navy of the United States has demonstrated, in action and in actual service, that it is one of the strongest and grandest navies in the world (applause); and it is agreed by all that our army has proven itself invincible. (Renewed applause.)

But I think as time moves on, in the wars that are to come hereafter, the navy will in all probability be used much more largely than the army. I believe this, for two reasons. It is much more easily handled, with less expense, and the probability is that our campaigns in the future will be upon the water rather than upon the land. In a conversation that I had with Gen. Merritt some two weeks ago—you will remember that he was the first United States General at Manila, having been sent there with the land forces to aid Admiral Dewey after the capture of Manila—he said, "He had been in the service a long time, but if he could enter into it now he thought that he would very much prefer the navy to the army, to which he had given 30 or 40 years of his life." He preferred the navy for the reason that he wanted to be with the branch of the service that carried their houses with them. (Cheers and laughter.)

Now, gentlemen, I congratulate you upon all of these matters which I have mentioned, and upon the growth of the country and the growth and advancement of the important interests you represent; and I congratulate you that you should have selected for this meeting of your Association the Champion City of Ohio—my old home. (Applause.) It gives me great pleasure to have this opportunity of welcoming you here to this city, where I came at an early date, when it was but a very small place compared to what it is now, and only two years after the incorporation of the Gas Light Company of this city, which was then organized with a capital of $30,000. But investments of that kind were not then deemed as desirable as they are now, for, after presenting the matter to the people for nearly a year, only a portion of the stock had been subscribed; but in about a year the works were built. They stood upon the northern part of the lot where the Arcade is now situated, and it was a very common thing to see, as you passed along in the morning, wagons unloading all sorts of spoiled meat and bacon and grease of any kind that could be secured at the gas works, because it was a grease gas works. The gas was made from grease. They continued that process of manufacture for some time before it was turned into a coal gas plant. If it were not for taking up too much of your time I should give you a few incidents making a little history of the Company, but I will not do it this morning, because the forenoon is well advanced. Possibly, if it should be your wish at some of the future sessions of the Association, I might be able to address you further on that subject and compare it with the works here at the present time.

I am also glad you are holding your meeting here in this temple of justice where the City Council enacts laws for the government of the city—and also the Gas Company (laughter and applause). At one time it was my privilege and honor to preside over the legislative body of this city—not in this room, but in another chamber used for that purpose. I refer to that with a great deal of pleasure, because during my term of office there was considerable extension of gas interests in Springfield. I know it was for the good of the people, and it has been my desire always to do something for my fellow citizens wherever I could. (Cheering.)

This city, I think, is entitled to be called the "Champion City," for it excels many other cities of its size, and in many things. I had hoped that we should have the pleasure of the presence of the chief executive of the city this morning, but I understand that he is detained on account of some business which could not be put aside.

We have large manufactories in Springfield. We have a promise of beautiful parks. They are just now being improved, and I am sure will be very beautiful when completed. We have a large number of churches. We have magnificent schools and colleges, and the citizenship is composed of those of God's noblest handiwork—splendid people—the same as with all the municipalities of our entire State; typical Americans and splendid citizens who are fond of their friends and always ready to care for strangers. The openhearted hospitality of this place is known throughout the State and throughout the land, and you are to be congratulated that you are here.

I know that the committee on entertainment has provided several functions for you which will perhaps, if you attend them all, interfere somewhat with your business sessions; but I hope you will have time to take them all in, and in seeing our city to know how it compares with others you have visited in the past and those you will visit in time to come.

You are certainly welcome here, and I speak now as the Chief Executive of the State. As I have said, I welcome you to the State of Ohio; and, in the absence of his honor the Mayor, I welcome you to the Champion City.

I hope your stay will be very pleasant, and that you will have such pleasant recollections of your meeting that you will desire to return again, and I shall be here then to welcome you once more as a fellow member of this Association and as a citizen interested in the industry in which you are all interested, and of which many of you are the managers.

With very pleasant and grateful recollections of the past and an abiding faith in the future, I wish you all good health and abundant prosperity, and in behalf of the Mayor of Springfield I now present to you the key of the city.

Vice-President Jenkins, in accepting the key, said: On behalf of the Ohio Gas Light Association, I have the pleasure of presenting to you Mr. Irvin Butterworth, of Columbus, Ohio, who will respond to the cordial welcome so generously extended by Governor Bushnell. (Great applause.)

Response by Mr. Butterworth.

Mr. President, I believe there is a popular song now going the rounds, entitled "Tell me that you love me," and I think human nature is such that a fellow always like to be told by his sweetheart that she loves him even if he already believes she does. So the members of this Association have experienced great pleasure in receiving this cordial welcome at the hands of Governor Bushnell, even though we felt reasonably sure beforehand that we were already welcome. That fact is pretty fully shown when you consider that this is the third time we have met in Springfield. In fact, I do not think there is another place in the State where our members would prefer to meet—outside of Columbus itself (laughter)—than in Columbus' beautiful and prosperous western suburb, Springfield. (Renewed laughter and cheers.) If I might be allowed to take some liberties with the name of Mr. Cline, the Manager of the local Gas Company, we "in Cline" to meet in Springfield.

I have no set speech to make, Mr. President. It is wholly unexpected to me that I should be called upon to respond, as you see by the printed programme. (Laughter and applause.) If I hesitate, I trust you will pardon me. (Renewed laughter.)

There is very little to be said except that we appreciate the cordial welcome which we have received, and that if any of our members are disposed to celebrate to too great an extent, by reason of the liberties which the Governor has given us in tendering us the key to this city, I hope the people will be charitable with us and not judge us too harshly.

I can only say we thank the Governor for his welcome and invitation, and the cordiality of his greeting is only equalled by our pleasure and appreciation. (Applause.)

Gov. Bushnell—I should have said, in presenting this key of the city to you, we have in Springfield a very discriminating and careful police force, and I can assure you from experience (laughter) they will not report you unless your lights go out (renewed laughter), and they will never run you in unless you raise too much heat on the corners. (Continued laughter and applause.) They are a splendid body of men, and they have been instructed by the Mayor—as I understand—to pass all who wear Association badges. (Renewed laughter and applause.)

Welcoming the Visitors.

President Jenkins said that those who were present as guests and visitors should feel that they were part of the assemblage, and know they were thoroughly welcome.

The regular order was then called.

On motion of Mr. J. W. R. Cline, reading of the minutes of the last meeting was dispensed with. The

Report of the Executive Committee

was then read by the Secretary:

To the Members of the Ohio Gas Light Association—Gentlemen: Your Executive Committee beg leave to submit for your consideration the following recommendations and report:

1st. That J. W. R. Cline, Irvin Butterworth and Jerome Penn be appointed a Nominating Committee.

2d. That Geo. H. Tayler, Moses Coombs and Geo. Whysall be appointed a Committee on Memorial.

3d. That H. L. Doherty, J. F. Seamon and Geo. Matt be appointed a Committee on Next Place of Meeting.

4th. That Gordon W. Lloyd, D. R. Roots and John Stout be released from membership at their own request.

5th. That (here follow eight names) be dropped from membership for non payment of dues.

6th. That the following be elected to Active Membership: James W. Dunbar, Supt. New Albany (Ind.) Gas Co.; Chas. H. Jacobs, Sec. and Treas. Detroit (Mich.) Meter Co.; W. N. Milsted, Sec. American Meter Co., New York city; Wm. E. Helme, of Helme & McIlhenny, 1339 Cherry street, Phila., Pa.; A. B. Eilbeck, Gen. Mgr. Welsbach Commercial Co., Drexel Bldg., Phila., Pa.; James Green, Pres. Sedalia (Mo.) Gas and Fuel Co.; R. Montgomery, Gen. Mgr. Youngstown (O.) Gas Co.; Bryce McAdam, Supt. Michigan City (Ind.) Gas Co.; James Forbes, Supt. Chattanooga (Tenn.) Gas Light Co.; Stanhope Boal, Vice-Pres. Favorite Stove and Range Co., Piqua, O.; H. A. Carpenter, Engr. Riter-Conley Mfg. Co., Pittsburg, Pa.; C. H. Cole, Sec. Lima (O.) Gas Light Co.; Frank J. Dwyer, Sec. Ideal Mfg. Co., Detroit, Mich.; W. B. George, Sec. Covington (Ky.) Gas Light Co.; Melville Gillette, Sec. and Treas. Newark (O.) Nat. Gas and Fuel Co.; C. M. Guenther, Mgr, Harris Bros. & Co., Phila., Pa.; E. M. Hanley, Sec. Dayton (O.) Coal and Fuel Co.; E. D. Johnston, Prest. and Gen. Mgr. P. H. & F. M. Roots Co., Connersville, Ind.; D. B. Kirk, Sec. and Treas. Mt. Vernon (O.) Gas Light and Coke Co.; Wm. H. Knight, Gen. Mgr. Cleveland (O.) Gas and Meter Co.; Clarence S. Lomax, Mgr. Wright Gas Co., Lorain, O.; R. S. P. Lowry, Salesman the Youghiogheny River Coal Co., Erie, Pa.; John R. Lynn, Supt. Port Huron (Mich.) Gas Co.; A. P. Maloney, Contracting Agt. Welsbach Street Lighting Co., Phila., Pa.; Edward Matt, Supt. Paducah (Ky.) Gas Light Co.; Chas. H. Printz, Asst. Supt. Zanesville (O.) Gas Light Co.; B. F. Rothstein, Salesman Columbia Inc. G. L. Co., New York City; Howard Swartz, Sec. and Treas. City Heat and Light Co., Fostoria, O.; H. J. Trenkamp, Schneider & Trenkamp Co., Cleveland, O.; G. M. Witherden, Harris Bros. & Co., Phila., Pa.; Lazard Kahn, F. & L. Kahn & Bros., Hamilton, O.; B. E. Chollar, Engr. Laclede Gas Light Co., St. Louis, Mo.; J. Davidson, Sec. and Treas. Ironton (O.) Gas Co.; F. B. Many, Mgr. Ohio, Welsbach Street Lighting Co. of America, Cleveland, O.; Walton Clark, Gen. Supt. U. G. I. Co., Phila., Pa.; F. A. Randle, Agt., Phila., Pa.; C. F. Scoville, Treas., Emerson McMillin & Co., 40 Wall street, New York City.

Respectfully submitted,

William C. Hedges, } Executive
Geo. H. Tayler, } Committee.

On motion of Mr. Irvin Butterworth the report of the Executive Committee was adopted and ordered spread upon the minutes of the Association.

Election of New Members.

The Secretary having been instructed to cast the ballot of the Association for the election to membership in the Association of the appli-

cants recommended by the Executive Committee in its report, he subsequently reported that such instruction had been complied with, and the names were ordered placed on the roll.

The following

REPORT FROM THE SECRETARY AND TREASURER,

which bore the approval of the Finance Committee, was adopted :

To the Members of the Ohio Gas Light Association : Gentlemen—I have the honor to present herewith the Fifteenth Annual Report of the Secretary and Treasurer, for the period between March 16, 1898, and March 15, 1899.

New members admitted at the 14th annual meeting...	18
Released from membership.....	19
Deaths.....	1
Active members this date.....	169
Honorary members this date.....	12
Badges on hand.....	11

Financial Report.

Receipts—

Balance from last year	$258.71
Received from dues	372.00
Received from initiations.....	90.00
Received from badges	9.00
Received from *Gas Journals* for report of the 14th annual meeting.....	96.35
	$826.06

Expenditures—

Printing and stationery.....	112.05
Postage	29.00
Expense of reporting 14th annual meeting.....	95.35
Secretary's salary.....	300.00
Expenses of President on Executive Committee....	15.00
Telegrams and telephone	16.48
Badges, one dozen.....	36.00
Floral piece.....	20.00
Express	.30
Balance on hand, as per certified check.....	200.88
	826.06

ROLL CALL

was responded to as follows :

Active.

Abbot, E. D., Springfield, O.
Allen, G. A., Zanesville, O.
Andrews, C. W., Hamilton, O.
Barnes, G. W., Pittsburg, Pa.
Baxter, I. C., Detroit, Mich.
Boal, S., Piqua, O.
Bonney, W. P., Erie, Pa.
Bushnell, A. S., Springfield, O.
Butterworth, I., Columbus, O.
Callender, E. P., New York.
Carpenter, F. A., Pittsburg, Pa.
Christian, G. H., Norwalk, O.
Clapp, G. N., Middletown, O.
Cline, J. W. R., Springfield, O.
Connelly, J. S., Titusville, Pa.
Coombs, M., Youngstown, O.
Cressler, A. D., Fort Wayne, Ind.
Critchlow, E. C., Meadville, Pa.
Chollar, B. E., St. Louis, Mo.
Cole, C. H., Lima, O.
Davidson, J., Ironton, O.
Dwyer, F. J., Detroit, Mich.
Dell, J., St. Louis, Mo.
Doherty, H. L., Madison, Wis.
Douglas, H.W., Ann Arbor, Mich.
Eaton, A. B., Chicago, Ills.
Eysenbach, E. E., Columbus, O.
Faben, C. R., Jr., Toledo, O.
Fisher, J. B., Marion, O.
Foster, B. P., Norwalk, O.
Gassett, A. L., Cleveland, O.
Gregory, J. M., Bellefontaine, O.
Gribbel, W. S., New York City.
Guldlin, O. N., Fort Wayne, Ind.
George, W. B., Covington, Ky.
Gillette, M., Newark, O.
Guenther, C. M., Phila., Pa.
Gwyn, E. C., Springfield, O.
Harper, H. D., Chicago, Ills.
Harris, J. A., Phila., Pa.
Hanley, E. M., Dayton, O.
Hedges, W. C., Mansfield, O.
Henderson, E. H., Pittsburg, Pa.
Jenkins, A. F., Buffalo, N. Y.
Jenkins, E. H., Buffalo, N. Y.
Jones, T. C., Delaware, O.
Johnston, E. D., Connersville, Ind.
Kahn, Lazard, Hamilton, O.
Kehoe, F. B., Portsmouth, O.
Kenan, N. G., Cincinnati, O.
Kirk, D. B., Mt. Vernon, O.
Knight, Wm. H., Cleveland, O.
Light, Geo., Dayton, O.
Lomax, C. S., Lorain, O.
Lowry, R. S. P., Erie, Pa.
Lynn, Jno. R., Port Huron, Mich.
McCormack, E. T., London, O.
McDonald, Donald, Louisville, Ky.
McDonald, Donald, Albany, N. Y.
McIlhenny, J. D., Phila., Pa.
Maloney, A. P., Phila., Pa.
Many, F. B., Cleveland, O.
Matt, E., Paducah, Ky.
Matt, Geo., Lancaster, O.
Maxon, J. H., Gallipolis, O.
Mayers, J. A., Columbus, O.
Miller, C. R., Beaver Falls, Pa.
Mills, John, Marietta, O.
Miner, J. R., Titusville, Pa.
Osius, Geo., Detroit, Mich.
Penn, J., Washington C. H., O.
Prichard, W. W., Portsmouth, O.
Printz, C. H., Zanesville, O.
Russell, D. R., St. Louis, Mo.
Rothstein, B. F., New York City.
Swartz, H., Fostoria, O.
Schmidt, E. C., Sandusky, O.
Seamon, J. F., Uniontown, Pa.
Smart, G. M., Dayton, O.
Spinning, D. C., Dayton, O.
Stacey, J. E., Cincinnati, O.
Stephens, J. G., Pittsburg, Pa.
Tayler, G. H., Warren, O.
Trenkamp, H. J., Cleveland, O.
Van Wie, E. G., Detroit, Mich.
Watt, R., Columbus, O.
Wells, L. W., Canton, O.
Witherden, G. M., Philadelphia, Pa.
Whysall, G., Springfield, O.
Wickham, L., St. Louis, Mo.
Wilkiemeyer, H., Evansville, Ind.
Wones, W. R., Covington, Ky.
Woollen, A. L., Newark, O.
Walters, J. W., Salem, O.

LETTERS OF REGRET.

The Secretary announced that letters had been received from the following named gentlemen expressing regret at their inability to be present at the meeting :

A. S. Miller, N. Y.; J. R. McLean, Washington, D. C.; W. Clark, Phila., Pa.; G. Pratt, Des Moines, Ia.; N. W. Gifford, New Bedford, Mass.; J. P. Harbison, Hartford, Conn ; J. Somerville, Indianapolis, Ind.; W. H. White, N.Y.; F. Persons, Dallas, Tex.; G. G. Ramsdell, Philadelphia, Pa.; E. H. Butler, Buffalo, N.Y.; R. L. Freyer, Buffalo, N.Y.; A. C. Humphreys, New York City; G. T. Thompson, New York City ; and J. W. Dunbar, New Albany, Ind.

The following letter, from Mr. J. H. Foley, Leavenworth, Kansas, Secretary of the Kansas Gas, Water and Electric Light Association, was also read :

LEAVENWORTH, KAN., March 13, 1899.

Mr. T. C. Jones, Secretary, Delaware, O. :

My Dear Sir : I am in receipt of your kind invitation to attend the 15th annual meeting of the Ohio Gas Light Association, to be held in Springfield, March 15 and 16, for which please accept my thanks. Through a peculiar coincidence the annual meeting of this Association, of which I am Secretary, is set for the same dates at Topeka, which will necessitate my being present.

I sent you an invitation to our meeting addressed Arcade Hotel, Springfield.

With best wishes, I am, yours very truly,

J. H. FOLEY, Secy.

Vice-President Jenkins then read his

INAUGURAL ADDRESS.

(For the address, see JOURNAL, ante, page 411.)

On motion of Mr. H. L. Doherty, the Secretary appointed Messrs. Donald McDonald (Louisville), W. C. Hedges and H. W. Douglas, a Committee to consider and report upon the address.

The President introduced Mr. C. W. Andrews, of Hamilton, O., who read the following paper, entitled

SOME NOTES ON THE CONSTRUCTION OF A CONCRETE GASHOLDER TANK.

On account of the unexpectedly large increase in the output of our Company, we were compelled to begin the construction of a larger holder late in the fall of 1897. Preliminary excavation having shown that sand and gravel underlaid the surface loam for a sufficient depth, it was determined to take advantage of the situation and use the sand and gravel in the construction of the tank, which was 83 feet 6 inches in diameter and 22 feet deep, inside dimensions.

Upon calculation it was found that, allowing 100 pounds per square inch tensile strength, concrete walls 24 inches thick at the bottom and 16 inches at the curb would be strong enough to resist the water pressure above the center without back filling. After the removal of the 5 feet of loam, which was stored for use in the final grading, sufficient gravel for the concrete and back filling was scooped out and piled at one side.

The excavation was surrounded by a railway switch on one side, a large dwelling on another, and a coke pile 15 feet high on the third, the nearest part of each of these being within 12 feet of the curb of the tank. It was, therefore, extremely necessary to prevent any excessive caving. The sides of the excavation were carried down with a slope of three to one. As the excavation became deeper, the sides were continually slushed with neat cement grout, which effectually prevented caving. On the side next the dwelling, shot gravel was encountered at a depth of 16 feet ; it was prevented from caving by this means until wall was run up 3 feet high.

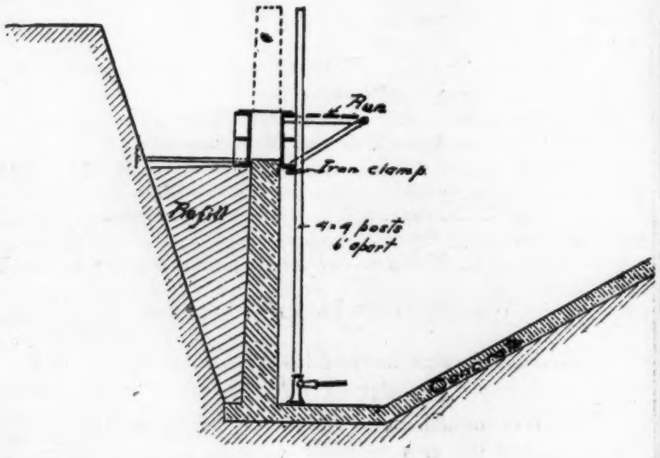
The excavation was commenced October 27 and completed November

17; on account of bad weather 7 days were lost, leaving only 14½ working days, of 10 hours each. During this time 5,000 cubic yards of earth were removed.

A washing machine was next constructed to separate the gravel and sand from the loam. It consisted of a hopper fed screen, 3 by 6 feet (½-inch mesh), inclined at an angle of 45°. A number of fine streams of water played on the gravel as it fell into the hopper and as it rolled down the screen, thus cleaning it, and washing the sand and loam into the box below. The water and sand were continually agitated by the hoeing out of the sand on an inclined bottom, the muddy water escaping through an opening near the top of the box.

In this way perfectly clean gravel and sharp sand were obtained. The concrete was composed of a mixture of three parts of sand to one part of the best Portland cement; sufficient mortar was allowed to fill the voids in the gravel with 10 per cent. allowance in addition, making the proportions 1 part cement, 3 parts sand and 7 parts gravel.

The mixing was done on a platform 16 by 16 feet. The sand being first evenly spread to a depth of about 3 inches, two bags of cement were added, and the whole turned over twice by shovelers. The mixture was again spread out and the gravel added; after this it was turned once, sufficient water was added and the mass turned over again. The concrete was then shoveled into wheelbarrows for delivery. Two mixing boards were used in order to keep the mixing gang busy, one being prepared while the other was being emptied. Only enough water was added during the mixing to show after thorough tamping.



Section of Mould for Concrete Tank.

The footing course, as well as the bottom of the tank, was first laid; an inside circular form, 3 feet high and split in two half circles, was then erected and carefully centered. It consisted of three circular rings made of two layers of 1 by 8-inch boards, sawed to the circle and spaced 17 inches on centers. The outside was sheeted with 1 by 3 inch pieces of matched flooring, tarred to prevent the cement adhering. The inside was suitably braced and arrangements made to support it by means of iron clamps attached to 4 by 4 by 22-foot posts, placed 6 feet apart. The 2-foot run for wheelbarrows was attached to the inside of the form, thus greatly lessening the work, the run remaining undisturbed during the shifting of the form. The outside mould consisted of similar segments about 30 feet long, which fitted between the piers. The footing course was first thoroughly grouted with neat cement. Concrete was then filled in and tamped in layers of 6 inches until the top of the mould was reached.

The inside mould was then jacked up 30 inches, allowing it to lay over 6 inches on the previous course. The rest of the raising was accomplished by means of lever jacks placed under alternate posts. After the form had been raised the required height, the clamps on the remaining posts were slipped up in place and the jacks removed, allowing the form to be supported on the alternate posts. The clamps were then slipped up on the remaining posts and the weight divided. The accompanying sketch shows a section of the forms and wall. The outside mould was also raised each time, and the two connected every 6 feet by 1 by 4-inch strips; the bottom was also braced against the banks. The back filling was tamped in 6-inch layers.

As severe freezing was nightly expected, 20 salamanders were constructed and kept burning constantly. These, together with careful covering of new concrete, prevented all damage from freezing.

While filling the first ring, the alternate freezing and thawing loosened one side, causing a cave, which sprung the inside mould considerably out of shape, and thus caused some difficulty in bringing the wall up plumb and to the circle.

The erection continued without interruption, except on account of bad weather. The top curb was plastered with a ½-inch coating of 1 to 2 mortar, thus completing the concrete work at midnight, Dec. 9th, the concrete work having 204 working hours, during which time 700 cubic yards of concrete had been placed. Several arc lamps were used during the construction to properly light the work.

Shortly afterward a few mild days were taken advantage of and the inside plastered with ½-inch coat of 1 to 2 mortar; the mould being used as a scaffold and lowered as the plastering proceeded. The bottom was also coated in like manner.

During the erection of the iron work, an additional wash of neat cement grout was applied with a heavy brush.

A pit surrounding the inlet and outlet pipes was so constructed as to expose a section of the wall 7 feet wide and 15 feet deep, in order to observe the amount of seepage. Upon filling the tank it was found that the seepage through the walls themselves was unimportant. On account of the expansion bolts fastening the wall plates having been inserted without being properly pointed up afterwards, a slight amount of leakage was caused. This was soon stopped by the addition of bran, and the leakage reduced to no more than in a brick tank of the same size. It is to be understood, however, that the concrete was not intended to be water tight, the plastering and washing of the interior being for that purpose.

In regard to the cost: In this case the gravel cost nothing at the washing machine, and labor 12½ to 15 cents per hour, whereas brick would have cost $6 per 1,000, and bricklayers 50 cents per hour. The total was, therefore, about two-thirds the cost of a similar brick tank.

Discussion.

The Vice-President—Gentlemen, this very interesting paper is now before you. I hope everybody will feel at liberty to criticise it, for we want a full and frank discussion of all subjects before the convention.

Mr. Donald McDonald (Louisville)—I would like to ask Mr. Andrews whether Louisville or other good American cement would not have done as well as Portland cement for the work which he describes? Of course he could have made the walls thicker by the use of such cement.

Mr. Andrews—We used Portland cement because we could depend on its quality. Probably all who have had occasion to use Louisville cement have found that it varies in quality very often, and it is almost impossible in this part of the country to get Louisville cement of first-class grade all the time. Being afraid to try anything of that kind in this instance we decided to and did use Weyland's cement, made in New York, which I think is one of the best cements on the market for that kind of work.

Mr. McDonald—If you were to specify cement up to a certain test, thereby getting cement of uniform quality, wouldn't you have trusted Louisville cement for the work?

Mr. Andrews—It might have been satisfactory, but a further objection was on account of the top of the curb being above the ground, and the further possibility of having to empty the tank at some time, when you would run the risk of having it all cracked to pieces by frost. Now, Portland cement will not crack after having set properly.

Mr. Cline—A little criticism I have to make on the paper refers to the last line of the first paragraph on page 4, where the gentleman says "Several arc lamps were used during the construction to properly light the work." (Laughter.)

Mr. Andrews—I will have to explain that by saying we operate an electric plant by gas engines. (Renewed laughter and applause.)

Mr. Whysall—How much cement would be required to make the concrete water tight and to do away with that leakage that had to be stopped by the addition of bran?

Mr. Andrews—The leakage you speak of was due to the fact that the expansion bolts fastening the wall plates had been inserted without being properly pointed up afterwards. It would have taken probably about 10 per cent. more mortar to have made the concrete water tight. The concrete was not intended to be water tight, the plastering and washing of the interior being for that purpose. We simply used enough mortar to fill the voids and a little more. If we had made the concrete softer it would have filled up more solidly, but would have been much weaker and lost strength thereby.

Mr. McDonald—In that case would you have considered the plastering on the inside necessary?

Mr. Andrews—I would have taken the same course in both cases simply from the point of safety. It costs very little to finish it in this way—I think about $50 altogether, as far as the labor was concerned.

Governor Bushnell—What is the object of making a tank out of cement or concrete? Is it because it was so much cheaper than steel?

Mr. Andrews—As I said, we had a gravel bank in the pit and it would have been rather expensive to get rid of the gravel.

Governor Bushnell—Then you wanted to utilize the raw material?

Mr. Andrews—That was the idea exactly.

Governor Bushnell—You did not compare it with the cost of any other tank? It seems to me that that would be a pretty risky thing; but as "The proof of the pudding, of course, is in the eating," you cannot determine or figure on the question of economy until sufficient time has elapsed to demonstrate whether it will stand, for unless it does it certainly would not be cheaper, even though you say it cost only about two-thirds of what a brick tank would cost. We have had some experience with brick tanks and we have had some trials after years of use. After having been perfectly tight, for some reason the brick and the cement (even the cement on the inside) would crack, so that I have been inclined of late years to the belief that it would be cheaper in the long run to put in a steel tank. I do not think from the experience we have had with brick that brick or concrete would be cheaper at any price That is the reason I asked the question. You have answered it frankly by saying you built this particular kind of tank so that you could use up the gravel.

Mr. Andrews—In case of concrete I may say that there is a very decided advantage over brick provided your tank stands the first year or so. As I said there is a very marked difference in the tensile strength of the two. Ordinary brickwork could not be expected to stand much over 50 to 100 pounds, whereas concrete will stand from 300 to 500 pounds after one year. We tested two briquettes which were one year old, made of mortar and used no cement, one 830, the other 866½ pounds per square inch. So you have a much larger factor of safety with concrete than you would have with a brick tank. Ours having stood a year, we think it is reasonable to suppose that it will keep on standing.

Mr. H. L. Doherty—In a discussion of the relative merits of concrete, brick and steel tanks, it might be of interest to note the fact that the only three accidents connected with gasholders within a certain recent period—I will not say exactly how long—have all been with steel tanks. The large tank in New York which bursted some time ago was a steel tank. I do not know whether our President saw the wreck or not, but it was one of the greatest sights I ever saw, and about the greatest mystery. Concrete is being used more and more for foundations. I know of my own personal observation, that I can make a better foundation for an engine or an electrical machine out of concrete than I can out of masonry. I can bind it to the subsoil more securely and there will be less vibration. All of the foundations for the New England Gas and Coke Company's plant are being made of concrete. They show great strength, and are more easily made, the materials are more easily handled and are handled by cheaper labor.

Mr. Andrews—One point in connection with the settling of the tank was covered in a way in this instance by first grouting the whole surface before putting the concrete down to the footing courses; grouting it until it soaked into the subsoil very thoroughly, and making a footing course which went down for several feet.

Mr. J. A. Mayers—I think to pour cement into gravel that was not cleaned would be money thrown away. It must have been very fine gravel to pour cement into it in order to make a good foundation.

The President—I believe Mr. Andrews stated he had an exceptionally fine bed of gravel that he wanted to utilize, which was the reason he constructed the tank of concrete.

Mr. Mayers—He thought it necessary, according to his paper, to wash the concrete, and I should have thought it would be necessary to wash the gravel to make a proper foundation for the use of cement.

Mr. Andrews—The washing was to a certain extent precautionary because we desired to separate the gravel and the sand anyhow, and we found that the cost of washing was very little in excess of the ordinary method we had used in similar cases.

Mr. A. D. Cressler—I would like to ask Mr. Doherty what class of material was used in the foundation to which he referred in the plant of the New England Gas and Coke Company. Was it gravel or broken stone?

Mr. Doherty—I was at Everett last week and stopped for a short time to see Mr. Wilcox and Mr. Finn, with whom I went over the plant. I was not so much interested in the foundation, and I would not be sure that I am right about it, therefore, I would prefer not to state what the proportions were. The percentage of sand, gravel, etc., for each foundation is dependent upon the weight it has to carry and other matters of that sort. In some cases I know we have used one part of cement to 13 parts of sand and gravel.

Mr. Cressler—My inquiry was as to the class of material used. Whether it was gravel or broken stone.

Mr. Doherty—Gravel and sand. They procured it right there on their own property.

Mr. Cressler—Our experience has been that broken stone is at least equal (if not better in a great many cases) to sand and gravel, and it is more easily obtained.

The President—I should judge in these two particular cases they had the gravel on the ground and desired to utilize it, otherwise they would probably have used broken stone.

Mr. Andrews—I take somewhat the other view. I consider gravel of various sizes really better than broken stone, for the reason that the different sizes fit in between each other and make more of a solid mass. whereas with broken stone it is very hard indeed, unless you use a large excess of cement mortar, to obtain a solid block of concrete, and that of course largely increases the cost.

Mr. Doherty—Mr. Andrews refers to the difficulty of obtaining a solid block of concrete by the use of broken stone as compared with gravel. The broken stone can be crushed and screened any size you want, and my experience is that it is sharper and will make a better foundation than gravel.

Mr. Mayers—I think a mixture of gravel and stone is better than stone alone or gravel alone in making a good concrete foundation.

On motion of Mr. J. D. McIlhenny a vote of thanks was tendered to Mr. Andrews for his valuable paper.

On motion, a recess, to terminate at 2 P.M., was ordered.

First Day, Afternoon Session.

The Association met pursuant to adjournment. The proceedings were commenced by the reading of two telegrams (from D. J. Collins, Phila., and E. C. Brown, N. Y.), wishing the Association a successful meeting; and Mr. Moses Coombs, of Youngstown, O., reported that Mr. Randall Montgomery, who succeeded the late President of the Association (Mr. B. P. Holmes) as General Manager of the Youngstown Gas Company, and who had been elected a member of the Association at this meeting, was unable to be present at the sessions, because of the pressing exigencies of his new position.

The President announced that, at the invitation of Mr. Maloney, of the Welsbach Street Lighting Company, the members were asked to sup at the Arcade Hotel immediately after the visit to the theater that evening, and further remarked that a

Supplemental Report from the Executive Committee

was in order. That report was read by Secretary Jones, as follows:

Springfield, O., March 15, 1899.

To the Members of the Ohio Gas Light Association—Gentlemen: Your Executive Committee beg leave to offer the following recommendation: That Honorable Asa S. Bushnell be elected to Honorary Membership.

Wm. C. Hedges, } Executive
Geo. H. Tayler, } Committee.

Election of Gov. Bushnell to Honorary Membership.

The report was greeted by hearty applause, after which President Jenkins said:

Gentlemen, you have heard the recommendation of the Executive Committee; what is your pleasure?

Mr. Jerome Penn—Mr. President, I take great pleasure in moving the adoption of the report that our honored Governor be made an honorary member of the Ohio Gas Light Association.

Mr. Norman G. Kenan—Mr. President, I think that the Association will honor itself by honoring our Governor with an election to honorary membership. He has always worked in and out of season, day and night, for the best interests of the fraternity, and I think we owe this to him without any question. I am satisfied it will be the unanimous sentiment of the membership of this Association to extend to him that honor to which he is so justly entitled. I therefore take pleasure in seconding the motion made by Mr. Penn.

The motion having been carried with hearty acclaim, Gov. Bushnell responded as follows:

Mr. President, and Gentlemen of the Ohio Gas Light Association: I am very much embarrassed to know what to say to you. It seems

hardly enough to simply say I thank you for the honor you have conferred upon me; but that is a good deal for one to say when he says it with as much sincerity as I do now. I appreciate very highly the compliment and the honor that you have paid me. I have been an active member of the Association ever since its organization, and this is its fifteenth annual meeting; and if you should permit, I shall expect to continue an active member of it and be honored with an honorary membership in addition, which is an honor indeed.

I do not exactly know, gentlemen, what this promotion carries with it, but if it carries a paid up membership that is considerable. However, I shall hope always to be able, and it shall be my effort, to contribute something to the success of this Association. Whether it may be annual dues or in some other form, it will be my pleasure always to contribute something to the success of the Ohio Gas Light Association, and to the success of its members individually and collectively. I will always be delighted to meet with you personally and meet with the Association.

Our Association has changed some since its first organization. Then we were all united, and our efforts were earnest in an endeavor to make artificial gas the light of the world. In the way of attaining that effort were competitors which we met on honorable terms, but naturally we thought first of our own interests and of our own light. I say the Association and its interests have, however, somewhat changed, because many of the companies which were exclusively artificial gas companies have since that time added electrical plants, because the people demanded that kind of light, and they made the gas companies the vehicle by which to furnish the electric light, or, rather, to pay the expenses of a more expensive light than that of gas. But it seems that that was the thing for us to do.

Electric light used to be the most painful light to me of any in the world. (Laughter.) Why, I could not see at all if there was an electric light about! But I have gotten over that, and now I can find my way around the streets and over the city even by means of electric light. (Renewed laughter and applause.) And it is a pretty good light, too. As I said, many of us are now in some way connected with the electric light interests. We must meet the wants of public demand, and if there is some other light that people want I do not think any else are more suited to furnish it to them, or better qualified to furnish it to them, than those who have spent their lives in furnishing gas light to the people. (Applause.) We want to contribute to their comfort and pleasure, and there is nothing else that will give people more pleasure or greater comfort than the furnishing of good, satisfactory light.

Now we have another light that is a little different. Great advancement has been made in regard to gas light, and it comes in now to compete with electric light for street lighting. We cannot tell just how far it will go, but my judgment is that it will be a very formidable competitor to electric light for street lighting purposes. We never should stand still, but we should keep our faces to the rising sun, not to the sun as it sets. We should keep going forward, making it our effort to discover something new in the line of our interests.

I shall hope to be spared to meet with you yet a good many times. I see among us the faces of young men who have grown up in the business since I had a little to do with it myself. I hope in this action you have taken you will not consider that you want to shelve me by making me an honorary member, but you will permit me to meet with you and be an active member with you.

Gentlemen, I again thank you most heartily for the honor that you have thus paid me. (Applause.)

[To be Continued.]

[Concluded from page 411.]

Innovation in and Future of the Water Gas Industry.[1]

[Adapted and translated for the JOURNAL, by Mr. F. Egner, from a paper read by Mr. H. CROISSANT, Manager of the Ludwigshafen gas works, at a meeting of the Mid-Rhenish Association of Gas and Water Engineers.]

While at Modling I could certify to the odorating of the gas by means of carbylamin. This gives the gas such an odor that the slightest escape will disagreeably affect the organs of smell.

With the new methods, especially with the Dellwick process, the heating energy of coals is converted into useful effect to an extent never reached before; but after water gas production has been subjected to as equally thorough study as has been coal gas manufacture, far more favorable results may be looked for, for it appears to me that neither the Dellwick nor Strache process exhausts all of the practical heat energy known to be inherent to coal.

The latest installatations after Dellwick's plans do not utilize the heat of the waste gases, which, in large works, would seem imperative by all means. Neither does Dellwick nor Strache recover the heat absorbed and carried away by the gas as it is produced.

By the possible thorough regeneration or recovery of all of the gases passing out of the regenerating apparatus, the production is bound to be increased, so that in converting coals into water gas we shall obtain by far the nearest results approaching a maximum recovery of all of the heat energy contained in the fuel—far surpassing, by comparison, all other performances in either gas or steam production known to-day. Consequently, water gas will be an important factor in the production of heat in the future.

By burning water gas in connection with the incandescent body or lamp, we even now convert heat into light with an enormous useful effect. For instance, to give 1,000 HK. hours of light—(the Hefner-Kerze unit, the German standard in photometric observations, bears to the English standard the relation that .73 bears to 1.—F. E.)—requires, by means of the incandescent gas lamp, 0.44 to 1.54 pounds of coal, whereas the electric arc light consumes from 4.40 to 6.61 pounds. Coal gas, after deducting the value of the residual products, consumes 6.61 to 7.25 pounds, and the incandescent electric lamp even 15.42 to 19.83 pounds to yield the same quantity of light. From this it would seem that economy would demand a turning to the production of water gas, and by practical management bring this industry to the highest useful effectiveness.

If in addition to this one considers that the operation of such a plant involves a much smaller expenditure on labor account (to date two men are sufficient to serve a generator of the largest capacity), and, furthermore, assuming a consumption of one-third of the gas used to be for heating and two-thirds for illuminating purposes, we obtain by the older methods 320 HK. power, and 1,700 calories (3,060 B.T.U.) with an expenditure of about 7.25 pounds of coal, while the same effect can be produced by means of water gas with an expenditure of only 0.44 pounds of fuel, it is reasonable to believe and assert that the construction of new plants and extensions to old ones will be more along plain water gas lines. Existing coal gas plants would have to be gradually converted into water gas works by serving certain districts with water gas only, even if this necessitated the laying of some additional mains. Again, in existing works the coal could be distilled as usual, and the hot coal gas and coke converted into water gas in suitable generators, thus the old benches could be utilized until worn out, after which one could turn to the manufacture of plain water gas, which is a gas rich in hydrogen, that will return a high illuminating effect when used in connection with incandescent burners.

Viewed in a purely logical light, the carbureting of gas, and especially by aid of the so-called fixing chambers, appears to me an effort utterly in the wrong direction. For does not the consumer destroy the illuminating power of the gas at this date, in most instances? This is certainly the case, wherever illuminating gas is used to day to serve the incandescent burner, or in gas cooking, heating or power appliances. Therefore, it seems that one should not furnish a self-illuminating gas, but to furnish a gas that possesses in the highest degree the qualities which would make it best for the evolution of either light or heat.

I can imagine ovens similar to our retort benches of to-day in which water gas shall be produced, which itself will assist in the distillation of the coal, by giving off its heat, like the products of combustion surrounding the retorts.

By reason of the changes in market values of the by products upon which the financial success of gas works depend to some extent, and by the ever-increasing coke works, also because of the immensely increasing demand for gas and the competition which all this brings with it, it appears to me that for the future a process which does not depend on by-products, but may rely upon its principal product, would furnish the surest basis for reliable income, while at the same time greatly simplifying the whole of the manufacturing and distributing managements.

The manifold objections brought up against water gas in these days are not any more serious than were made some 40 or 50 years ago against the present illuminating gas. Granted, however, that some of the constituents of water gas are dangerous in a certain degree, and that through carelessness accidents may occur, those are only characteristic, or peculiarly distinctive, of the rapid progress of our technical era. All new advances are accompanied seemingly by added dangers, but these again are partly nullified and compensated for by an increase

1. *Journal fur Gasbeleuchtung.*

of education and a heightened intellect on the part of the public employing them, as well as by the science which brings them forth. All such innovations present advantages in the field of hygienic economy, and are so beneficial to mankind in general that they probably more than balance the few occasional accidents.

Water gas is more poisonous than illuminating gas; but by careful and well executed piping, using such apparatus which will announce taps left open through carelessness, or by employing self-lighters,[1] greater security may be assured to health and life, by the use of plain uncarbureted water gas than is actually possible with the ordinary illuminating gas of to-day?

Right here I would call attention to a matter which may be regarded as somewhat weighty, but which could easily be met by suitable precautions. In the autumn of 1897 we suddenly were met by many complaints about a strong odor of gas, always in the older class of houses. The cause was mainly the giving out of a purifier over night, and the change from purified to not well purified gas was quickly noted by consumers dwelling in houses of the description named. The same leaks existed before, but the people had become used to that odor, and did not notice that anything was wrong until the circumstance named occurred. All I could do was to advise all complainants to have their house pipes thoroughly overhauled; for evidently these must have been faulty, else no change in odor of the gas would have been noted, if none escaped.

The same thing would have to be done before changing to water gas. But if the gas was odorized by means of carbylamin, the slightest escape would cause such a stench that people would of their own accord and account quickly have their gas fixtures put in order.

The artificial odorizing of the gas is, therefore, a sure preventive of gas poisoning.

The more poisonous nature of water gas is offset by its lesser liability to cause explosions, since much larger proportions of air must be mixed with it to produce a real explosive mixture. And the danger from explosion is still more reduced by reason of the smaller quantity which need flow from any burner tap to do the work required, so that a burner might be open a good while in a closed room before the point of danger from explosion would be reached.

Referring to a paper by Dr. Eitner, concerning the naphthaline question, recently read at Kaiserslautern, it was stated that in American water gas districts naphthaline formations had occurred. Evidently if simple water gas was manufactured, and the carbureting and fixing apparatus not employed at all, trouble from that source cannot be imagined. Circular letters of inquiry sent to manufactories where simple water gas or the "Dowson" gas is made, resulted in negative replies. That is to say, there was no naphthaline. Mr. Croissant concludes by stating that plain water gas should be sold according to its greater illuminating power with the incandescent burner, and not relatively, according to its heat units as compared with coal gas, and that if this were done, plain water gas might be sold at as good a figure as the present gas and be cheaper to the consumer, while of course more profitable to the producer at the same time.

He calls attention to the necessity of alterations in heating and cooking apparatus if plain water gas was used, and to the fact that as a much greater consumption on the whole may be looked for, the price might be reduced and still the income of gas companies be enormously increased by the introduction of plain water gas for general consumption. Since less gas is required to produce a certain quantity of light, the apprehensions that present main systems might not be large enough are groundless. Gas motors in which water gas instead of illuminating gas would be used would be reduced about 8 to 10 per cent. in power, but this would be so little that, with a reduction in price of the gas required, the change would not be unfavorable.

The author then recapitulates the advantages of water gas producers over the older coal gas system, which are so well known here. He shows that for medium sized manufactories gas would be cheaper than steam as a source of power, and that in very large plants it could easily compete with steam in point of cheapness. He views gas for heating as the only true solution of the smoke nuisance, and predicts a great future for plain water gas, because, for the individual as well as for the world in general, the simple water gas process presents the best means by which nearly all of the heating power contained in coal may be recovered in the form of useful energy, and it is therefore sure to be adopted by reason of its hygienic as well as economic advantages.

1. It seems to be but little known among our American profession, not to speak of the general public, that very simple methods may be employed to eliminate all danger from "blowing out the gas," or any other escape of gas, through apparatus designed for public use. For example: Small platinum or palladium wires are attached to the burner tubes, the result being that if gas at all charged with hydrogen impinges upon them, they become white hot, and thus ignite the gas. The reader will readily see that by such means the blowing out of the gas would resolve itself into a huge joke on the blower; greatly reducing the work of coroner's juries, and with manifest benefit to all concerned.

Shop Floors.

In a report to the Association of Railway Superintendents of Bridges and Buildings, on the method of laying brick floors in shops and like structures, it is said:

Assuming the soil to be firm and well drained, excavate the ground to an even surface 8 inches below grade of desired floor. Tamp well with heavy rammers to secure a firm foundation, then fill in with good clean sand or gravel to within 3½ inches of grade, making a crown of about 2 inches between pits for drainage; wet this down well, tamp with rammers and trim off with straightedge, taking care to get good even surface brick on edge, close to each other, and breaking joints so the tops come one-half above grade. After laying, roll bricks with 2,000 or 3,000 pound roller, cover the surface with one inch fine sand and broom it well into cracks, or fill cracks with cement grout. A concrete foundation is recommended by some, but except in cases where the natural ground is not firm, or where the floor is to be subject to extremely heavy loads, it is not considered necessary.

For blacksmith shops or foundries the natural earth frequently forms a very suitable as well as substantial floor. In localities where the soil is too soft in its natural state, the addition of cinders or clay will solve the problem cheaply and satisfactorily.

In machine shops the conditions are different, and here we find the recommendations almost as varied as are those for round house floors. A brick floor in a machine shop answers many of the requirements, but there is good evidence in support of the objection that men cannot stand all day on such a floor or upon a surface of concrete or asphalt without feeling the bad effects of cold upon the feet. This difficulty is overcome to a large extent by the use of slatted floor racks or platforms at the machines where operatives stand. When machines are set upon a brick floor there should be special provisions made for foundation. But this can hardly be urged as an objection, as it is necessarily the case with heavy machines under almost any circumstances.

A bedded plank floor has recently been laid in an extensive shop plant of the Boston & Maine road. The earth is well compacted and brought to the proper surface and a bed of coal tar concrete put down in three courses. This bed is 4 inches thick when finished. The specifications are that the stones of the lower course shall not be less than 1 inch in diameter, and those of the second course not more than 1 inch in diameter. Stones of each course to be well covered with tar before laying and thoroughly rolled afterward. The finishing course to be composed of good, clean, sharp sand, well dried, then heated hot and mixed with pitch and tar and brought to a true level to fit a straight edge. Roller to weigh not less than 700 pounds on a length not exceeding 22 inches. On this finished surface of the foundation there is spread a coating ¼-inch thick of the best roofing pitch, put on hot, into which the lower course of plank is laid before it cools. Care must be taken to have the plank thoroughly bedded in the pitch, and, after laying, the joints must be filled with pitch. If vacant places occur under plank they should be bored and filled. The finishing flooring is laid across the lower and thoroughly nailed.

For the lower course 2½-inch spruce plank s.l.s. is used, and for the upper 1½-inch s.l.s. spruce plank. It is also noted that the lumber for lower course should be fairly seasoned, and that of the upper course well seasoned before using. The cost of such a floor is given at 18 cents per square foot, using spruce lumber.

For paint shops and car shops a brick floor has been found very satisfactory. The committee believes that a brick floor, generally speaking, is the most economical, durable and satisfactory floor for shops as well as for round houses.

Standard Charges for Electric Current.

[A paper read by Mr. C. R. Maunsell,[1] before the First Annual Meeting of the Kansas Gas, Water and Electric Light Association.]

It is my purpose in giving this paper to set forth the advantages to all electric lighting interests of this State of knowing what the cost is of producing a unit quantity of current and then adopting that unit as a standard for all charges. As the kilowatt is the world's standard, I would suggest it as the proper one for the system outlined below.

1. Supt. Edison Electric and Illuminating Company, Topeka, Kansas.

The most essential point in the operation of an electric light station is to know what number of kw. is produced each month, and then what the cost is per kw. each month. I say each month, for this cost varies as the output increases or decreases. If we increase our output we can always decrease the cost, and thereby increase our business.

We all know exactly what the expense of our station is in dollars and cents, but very few take trouble to know what the cost per kw. is, because we have all learned that, at a certain number of lights operated, we are making enough to pay expenses and leave a sum for dividends (if such a thing is possible).

Now if we know what quantity of current is produced and what that quantity cost per unit, we are in a position to sell that current for as close a margin of profit as any other merchant in town sells his goods; and if we sell on a close margin we can always sell more to the largest buyers than we can if we overcharge them, who by-the-way are not always our best customers, as they may demand that supply at a time when we are least able to furnish it.

To illustrate this point. Suppose a hotel that now uses gas or oil could be made a price per kw. at 10 per cent. more than average cost to the station; when you have determined what that cost is you are in a position to secure that customer, and that class of business is the most desirable because of the long hours it utilizes your machinery.

Now some will say, "That is all very well for large stations where current is sold by meter, but we can't afford meters in our town."

Well, maybe you can't put all your customers on meter at once, but you can put some of them; and if you make a close rate on meter system to a few large flat rate users they will do a great deal toward solving the problem of the rest going on meter.

Mr. Caryl D. Haskins says: "The fact is established that one-third more customers can be supplied on the generating capacity on the meter system than can be on flat rates, and yet have the net price earned per lamp remain the same;" and I can indorse him in this statement.

In the case of high tension arc lighting systems the same care should be taken to know the cost per kw. as in incandescent or power work, and this is a very easy question to solve, for arc circuits are controlled from the station and the supply or use of light is held in our hands; so when we make a flat rate per lamp to a customer, if we base it on the cost per kw. used for the time light is supplied, we make a profit on every lamp, provided we charge for a stated number of hours' use and see that number is not exceeded. Of course, if the customer does not use the full time, that is his privilege; we make the profit estimated on and more.

Did you ever stop to think that very few Edison Companies have failed in business, and why that fact is true?

The whole secret is because from the first Edison stations have known what a kw. of current cost, and were, therefore, in a better position to sell their output than those who did not know.

In the early days, when all current was sold on flat rates, these rates were based on the cost per kw., and the Edison stations were the first to use meters, for they soon learned that flat rates were good things to avoid.

Again, did you ever know a gas company to make flat rates after they had been in business a few years? Why are gas companies all on meter system? Because they know what the cost is per 1,000 cubic feet of gas, and have learned the uselessness of flat rates.

Finally, I would urge the stations of Kansas still selling current on flat rates to abandon a system so unjust both to themselves and their customers, and to adopt meter system of charges based on the cost per kw.

A Missing Link.

[By Mr. E. W. Schermerhorn, Schenectady, N. Y.]

One great obstacle with which every manager of a gas company has to contend is the arrangement of lights. By this is not meant artistic effects alone, but such as will either concentrate or distribute the light where necessary with the least waste possible.

The manager of the past simply put burners in a room, and the consumer then placed over them thick, frosted, glass shades with a small opening at the bottom; the shade absorbing half the light, the other half illuminating the ceiling.

In this money making age the manager is obliged to give the best possible light with a small consumption of gas. This, of course, brings us to the incandescent light, which of itself is an awkward affair in comparison with an electric bulb, which latter has the advantage of being placed in any corner and at any angle. These disadvantages are what have to be overcome, which can only be done by knowing at what angle the raw light is cast, then placing a shade over it which will diffuse or deflect the rays to the needed spot and still be graceful. The holophane comes the closest to this. But where all systems are lacking is in the illumination of rooms from brackets. The light being given out equally on all sides, one-third is thrown where not needed.

Take, for example, a church with galleries. The only manner of lighting under them is by brackets placed high enough so as not to put the congregation in any danger from contact with burner. The light from these will illuminate the ceiling and wall, the greater portion being taken by them by reason of their being tinted, and of such colors as to absorb it. The only effective cure in this case at present is a reflector, which will not be tolerated principally because of its clumsy and raw appearance.

Is there no help for this? Can it be a fact that there is no shade which will answer for bracket illumination that, while utilizing the wasted light to illuminate where necessary, will still be graceful?

It seems hardly possible that such can be the case, considering the number of years gas has been used as an illuminant, and of late years with the incandescent electric light as a competitor, which, with the advantage of being placed at any angle, obviates this difficulty.

Nevertheless it is one of the cold facts.

The Flash Point of Burning Oils.

By Mr. Alexander Robertson, of Peebles, N. B., in *Jour. Gas Lighting.*

In view of the interest that is at present being taken in prospective legislation regarding the fixing of what should be the flash point of lamp oils, it may be interesting and instructive to direct attention to some of the physico-chemical conditions having a more or less direct bearing upon the subject.

To make plain the train of thought which suggested the writing of this article, it is necessary to start with some truisms which may help to put the reader and the writer in the same state of mind to examine impartially this vexed question. The object aimed at in fixing the flash point of lamp oil is to secure a reasonable degree of safety from explosion and fires—more particularly the former. It is evident that to insure this reasonable degree of safety the lamp oil must not give off vapor so as to form an explosive mixture with the air at a temperature such as that to which it may be subjected when used for domestic illumination. The conditions which influence the temperature of oil in the lamp are various, but may be conveniently defined as three: (1) Those arising from conditions external to the lamp, such as the temperature of the atmosphere in the place or room where the oil is used, or to the heat which may be radiated or convected from the fire grate. (2) Those due to the construction of the lamp, such as the conduction of heat from the flame of the burning oil by the metalwork to the oil in the lamp fountain, or radiated heat from reflectors. (3) The difference in the heat that may be transmitted to the oils in the lamp fountain due to a difference in the molecular structure or constitution of the oils themselves.

All these conditions have received attention. The first and the second have been fairly well determined and fully taken into consideration in fixing what would appear to be such a flash point as would insure reasonable safety. It is very doubtful, however, if the third set of conditions has received the scientific investigation it deserves, as it would appear from recent lamp accidents that oils having like flash points are very far from possessing a like degree of safety. In illustration of how the difference comes about, reference may be made to the knowledge recently acquired regarding equivalent differences in the combustion of illuminating gases.

The gases, acetylene, ethylene and ethane all contain the same quantity of carbon in the molecule, only combined with different proportions of hydrogen; being members of three important homologous groups of hydrocarbons. Carbon is, as is well known, the element which emits the light during the burning of a hydrocarbon; yet the same quantity of carbon contained in these gases, instead of emitting anything like the same equivalents of light, emits light in the enormously different proportions of 250, 68 and 35 candles respectively. The question naturally suggests itself how such a result comes about. Recent investigation has shown that the result is due to heat energy locked up in these respective compound gases, and to the manner in which this heat is given out in process of combustion.

Acetylene has locked up in its molecules a quantity of heat energy largely in excess of that which would be given out by the combustion of its constituent elements separately. This locked-up heat energy is rapidly and locally evolved at the instant of decomposition; and the heat given out is so quickly transmitted from molecule to molecule that decomposition is apt to take place even in the jet through which the acetylene passes to the flame, with the result that carbon may be deposited there and give trouble. Ethylene also has stored up in its

molecules a considerable amount of heat in excess of that which would be given out by its constituents, carbon and hydrogen, but much less than in acetylene. The heat evolved during its combustion is neither so rapidly nor so locally given out as in the case of acetylene; and there is therefore less tendency for the burner to become heated, or decomposition to take place in the jet of the burner. The stored-up heat is, however, given out in the body of the flame; bringing about decomposition and setting free the carbon, and emitting still a considerable amount of light. Ethane, on the other hand, has not such heat stored up in its molecules, but rather contains less than that which would result from the combustion of its constituent elements separately; and the combustion is still less rapidly and locally carried on, and at a considerable distance from the burner, where decomposition takes place, and where luminous carbon takes its part in giving out light with little or no transmission of heat to the burner.

Now similar differences obtain in the case of lamp oils, due to the difference in their constitution. The largest proportion of American mineral lamp oils are mainly composed of paraffines belonging to the same group of hydrocarbons as the ethane gas; and they therefore develop the least amount of heat locally. The paraffines being also easily decomposed at comparatively low temperatures, and capable of decomposition into equivalents of simpler paraffines and olefines, with the absorption of heat and without the deposition of solid carbon, are the cleanest as well as the coolest burning of all lamp oils.

The Scotch lamp oils are mainly composed of the paraffine and olefine groups of hydrocarbons; and for the reasons just explained, they also burn without developing much local heat, and burn both fairly cool and clean. But there are many other lamp oils—such as some of those from Russia—in which the paraffines are practically absent, but which are composed of other series of hydrocarbons of much higher specific gravities, which cannot be decomposed or cracked up without the deposition of carbon, and which develop considerably more local heat than the other lamp oils composed mainly of the paraffine group or a mixture of the paraffine and olefine series of hydrocarbons. They consequently burn neither so cleanly nor so cool. As with illuminating gas, so with oil—that which burns cooler gives least light per unit quantity. But the public prefer such oils; and on this account American oil commands a higher price than other less clean and cool burning oils, though possibly less safe. The constitution of lamp oils is further liable to great differences due to defective refining, and it may be in some cases wilful manipulation during the process—more particularly in the fractional separation of the oils by distillation.

It is evident that, before an oil can be burned, it must first be volatilized and pass into the state of vapor; and that therefore the temperature of the oil on the surface of the lamp wick must be above the volatilizing point of the oil. As a consequence it follows that, other conditions being the same, the temperature of the burner should rise as the temperature at which the oil volatilized rises. At first sight, it might appear that the result of raising the flash point—which is practically equivalent to raising the boiling point—would necessarily involve a rise in the temperature of both wick and burner, and that thus the advantages of raising the flash point would to a great extent be nullified. But we have already seen that there are other conditions which may be present, having a material influence in modifying the heat evolved at the point of ignition. This, however, is not all. Lamp oils derived from petroleum or from artificial paraffine oils, consist of a series of hydrocarbons gradually rising in specific gravity and in their boiling points. A good honest lamp oil consists of a cut from the distillate consisting of the whole series suitable for illuminating purposes, with light naphtha and heavy oils excluded. Now with such an oil it does not follow that the raising of the flash point necessarily involves a greater development of heat in the burner. It will altogether depend upon the constitution of the oils, and what means are employed in raising the flash point.

The volatilizing point of a homologous series of hydrocarbons from the surface of a lamp wick is, at first, that of the most volatile of the series. But as each successively less and less volatile portion evaporates, the temperature rises, till every member of the series is evaporated simultaneously, as they are brought forward by the capillary action of the wick and under the heat influence of the flame. If the sole condition operating in determining the temperature of the wick and burner was the volatility of the oil, the temperature would be the mean of their respective volatility. We have seen, however, that with the paraffine group of hydrocarbons, they are easily decomposed. Indeed, they decompose at their temperature of evaporation; and this is more particularly the case with the higher and less volatile paraffines. As heat is absorbed in the cracking-up process, the temperature of the wick and burner is thus kept lower than it would otherwise be; and therefore lamp oils mainly composed of paraffines do not necessarily develop more heat in the burner as the flash point rises. Therefore, the petroleums mainly composed of paraffines are made safer in proportion as the flash point is raised. Besides, if the flash point is raised as it should be by fractionating out a portion of both the most and least volatile of the paraffines, the mean volatilizing temperature from the surface of the wick would not be much altered either way. A similar set of conditions obtains with properly fractionated oils composed of mixtures of paraffines and olefines, as is the case with Scotch oils.

The conditions are very different in the case of oils which decompose with the evolution of carbon comparatively close to, or in the surface tissue of the lamp wick, due to their molecular structure (as already explained), to defective chemical treatment, or to the intentional method in which the oils have been fractionated. In such cases, a large amount of local heat is evolved, which is much in excess of that necessary for evaporation. This excess of heat is dissipated in all directions, and there have been instances in which the lamp burner fittings have been quite destroyed, and the contents of the fountain fired.

It is evident, therefore, in fixing a flash point, that it would be impossible to fix it so as to render the latter class of oils reasonably safe, without unnecessarily increasing the cost to the public, and causing unnecessary loss to the class of lamp oil producers who had naturally clean and cool burning oils, and who had put them upon the market after honest fractionation and careful chemical treatment. Very similar remarks apply to lamps. Just as the demand for low priced oils has induced the toleration of low flash point and impure oils, and made the Government reluctant to impose restrictions, so it is with lamps.

There is no doubt that badly constructed, flimsily got up lamps have been as much to blame for accidents as faulty oils. Though this may be the case, however, there must be some standard of flash point; and while it would be unfair to fix a standard that would press with undue hardship upon the consumer or the producer, yet both commercially and in the interests of public safety the standard should be so high as to make oils reasonably safe under the conditions which must be unavoidably present at certain times, and under common circumstances, during their use.

The present flash point is 73° F. It is evident that such a flash point is too low, even for the highest class of oils, as climatic conditions alone are on many occasions such as to raise the oil to the explosive point; and however cool burning the oil may be, and however well constructed the lamps, some heat must pass from the luminous flame by radiation, if by nothing else, to the oil in the fount. It therefore seems evident that the flash point should be raised, so that with care, and under the best conditions, there should be a desirable and reasonable amount of safety attending the use of an article that has become a necessity.

[From the San Francisco *Report*, March 8th.]

A Plain Statement Respecting the Values of the Gas Made by the San Francisco Gas and Electric Company and by the Equitable Gas Company of the Same City.

"What we are going to prove to you to-day is that the gas manufactured by the San Francisco Company at $1.75 a thousand is cheaper and better than the new gas of the Equitable Company at $1." When J. B. Crockett, President of the San Francisco Gas and Electric Company, made this assertion he was standing in a small room at No. 116 Stockton street, Tuesday afternoon, surrounded by a crowd consisting of the Mayor, nearly every member of the Board of Supervisors, gas experts, representatives of the press and other interested parties. Continuing he said that his Company had hitherto refrained from entering into any controversy with the new comer, satisfied to leave to the consumers the question as to the quality and relative cheapness of the two kinds of gas, but that a few days ago the Equitable Company had invited the Mayor and Supervisors to witness tests of the two gases in a Stockton street restaurant, an exhibition which the older Companies were not invited to attend, and had announced results of such a surprising character that he felt that he could not allow them to go unchallenged. As a result he had decided to call the present gathering to allow every one to see the tests of the two gases and to judge for himself. He wanted everything to be perfectly fair and he invited every one to ask questions at any time, especially President Ackerman of the Equitable, and Dr. Chisholm, inventor of the new process, both of whom were present.

The rooms on Stockton street were secured by the San Francisco Company for use as a gas laboratory for the reason that the main of

the new Company runs along that street from the works at North Beach, and a supply of the new gas could be obtained. They had been supplied with all the apparatus usually employed in analyzing and testing gas, and have been in use ever since the new Company has been supplying gas, daily comparative tests having been made of the two gases.

Dr. Chisholm, replying to President Crockett, said that it was impossibte to fairly test two dissimilar gases by means of the apparatus in the laboratory, and he asserted that the usual photometric examination to determine candle power was wholly unreliable. He said, moreover, that his gas was a much heavier gas and was under higher pressure than the old gas, and that consequently the tests would not be fair.

On the latter point President Crockett reminded him that the recent tests made by the Equitable Company for the benefit of the Supervisors has been made under the same circumstances and that the gas, as tested, was the gas that was delivered to the consumers.

Then President Ackerman, of the Equitable, entered into the discussion, confirming the statements of Dr. Chisholm, and asserting that, no matter what the tests might show, he would not admit the inferiority of the new gas.

E. C. Jones, Engineer of the San Francisco Company, took general charge of proceedings at this stage and invited those present to witness the first test, that of the brightness of the light. He said that as Dr. Chisholm had objected to the use of the photometer he would dispense with it, as in the present case it was unnecessary, the difference being one easily seen with the unaided eye. A Welsbach burner of standard make, and supplied with the San Francisco Company's gas, was lighted and adjusted until the best result was obtained. Then a meter was read and it was found that the gas was being burned at the rate of 2.6 feet per hour. Without altering the meter or the burner, the San Francisco gas was disconnected and connection was made with an Equitable pipe, the gas passing at the same rate, 2.6 feet per hour. At first no difference was noticed and it was explained that the meter was full of San Francisco gas, which had to burn out. In a few minutes the light began to lessen, and when the Equitable gas was fairly burning the burner showed but feeble incandescence. The light had so greatly decreased that those watching the meter were compelled to light matches to see the figures. Engineer Swain, of the Equitable Company, was then directed to adjust the burner for the best effect from his gas, and when this was done the meter showed 4.2 feet as the consumption per hour.

An experiment showing the two gases burning in the ordinary flat-flame burner used in houses brought on a long chemical discussion concerning the composition of the new gas. The old gas burned without difficulty, giving a brilliant light. The new gas in the same burner blew itself out unless a very limited supply of gas was admitted, and then it burned with a flame possessing but little luminosity. When turned on more the new gas went out.

A question from Mayor Phelan as to the cause of this latter phenomenon brought in a discussion between Dr. Chisholm of the Equitable and Engineer Jones of the San Francisco. The latter explained to the Mayor that the blowing out of the light was due to the fact that the Equitable gas had so little combustible matter in it. He said that analysis showed that 75 per cent. of the gas was nitrogen and other non-combustible material.

This statement aroused the ire of Dr. Chisholm. He admitted that there was as much nitrogen in the gas as had been asserted, but he denied that it was non-combustible. The recent researches had shown that nitrogen was not the simple elemental gas it had formerly been supposed to be, but consisted of other elements. The process of the Equitable Company, being electrical in character, destroyed the non-combustible character of the nitrogen, so that, although analyses made for them showed over 70 per cent. of nitrogen, it was not proved, and they did not admit that this nitrogen was non combustible.

To this Engineer Jones replied that the analyses of the Equitable gas made by the San Francisco Company had shown the gas to be better than those made especially for the Equitable Company, but had also shown very conclusively that the nitrogen present was the same old incombustible nitrogen of the text books.

Both Dr. Chisholm and President Ackerman invited those present to visit the offices of the Equitable Company, where they said could be seen the gas burning in flat burners. This invitation was accepted by the gas experts present, and later in the day the examination was made. It was found to be as had been asserted, but it was found also that the burners were consuming nearly 10 cubic feet an hour, three times the usual consumption, and were giving out comparatively little light.

Before the gathering in the Stockton street laboratory had ended, tests were made with a gas stove, such as is ordinarily used for cooking purposes in hundreds of families. The San Francisco gas burned without the slightest difficulty, while that manufactured by the Equitable Company could only be lighted, as in the flat burner, by turning the gas almost off, the resulting flame being small and unsatisfactory. At the offices of the Equitable Company the gas stoves proved rather refractory, although they did behave better than with the gas on Stockton street.

One interesting exhibit made by the San Francisco Company during the tests consisted of a quantity of clear liquid which had been obtained by cooling down 100 cubic feet of the Equitable gas. Its interest lay in the fact that the Equitable Company has persistently claimed that its gas was a permanent, fixed gas, free from condensible material. Its exhibition caused Dr. Chisholm to retort that the San Francisco gas smoked and put the mantles of Welbach burners in mourning, a charge which President Crockett said he would not deny, as it had no bearing whatever on the question as to whether the Equitable gas did or did not contain condensible material. His Company had never claimed that its gas would not smoke if improperly used, while the Equitable had claimed that its gas contained no condensible material.

After the inspection of the office of the Equitable Company on California street a meter and lamp were carried to a nearby plumber's shop on California street, in order that the gas of the San Francisco Company, just delivered to consumers, might be tested. The results confirmed those already obtained.

The general results of the tests were decidedly favorable to the old Company. The managers of the Equitable claimed the tests unfair, but were obliged to admit that their gas as tested was such as they were delivering to customers. The general verdict of the unprejudiced witnesses was that the San Francisco Company had succeeded in proving all it had set out to prove, that a certain quantity of its gas could produce as much effect both in lighting and heating as a much larger quantity of the new gas.

What Will Check the Demand?

A very sensible editorial in *Iron Age*, written in partial reply to the question asked in the caption, declares that the rapid enhancement of prices is by no means giving general satisfaction. Even those who seem to be profiting most by the rise in values are not serenely happy. They, of course, feel better than when they were striving not long since to make both ends meet. But if they had their choice probably not a dissenting voice would be heard to the proposition that a moderate volume of business at a reasonable profit would be desirable and preferable. The change has been so rapid that all calculations are upset. Some producers are loaded far into the future with low priced contracts. These must be filled even if margins are cut down by higher wages, dearer materials and advanced freight ratds. When a sale is made it is impossible to cover all elements of cost, no matter how capable the management may be. A great deal of business is thus in progress of completion which is affected adversely by the decided change in market conditions. The prices now being realized are making old contracts exceedingly burdensome. Few manufacturers are so fortunate as to be entirely free from obligations of this kind, so that they can immediately reap the full advantage of every rise in values.

The question which is now on every tongue is, How long will the upward movement continue? To which the only answer is, either until consumption is checked by the conservatism of buyers or production is stimulated beyond the point of meeting the demand. It may be safely assumed, we think, that so thoroughly has a belief in permanently low prices been implanted in all business circles by the events of the past six years that a point may soon be reached in the upward flight of prices which will cause buyers and consumers to try to get along for a little while without buying any more. Contemplated improvements may be not only checked, but may be completely shelved to await the return of a cheaper era. A 10 per cent. advance may stimulate business, and a 25 per cent. advance may cause some wild buying, especially among those who need material to fill contracts, but a 50 or 100 per cent. jump is likely to induce reflection and possibilities of economy or substitution. If values were to settle on their present basis and be maintained there for a few months, another process of education would set in which would prepare the business world to regard advances from that plane with approval and perhaps with no special anxiety. But to soar in an unbroken flight from the lowest prices on record to the level of boom periods certainly means a sharp restriction of consumption as that level is approached.

No man, however, and no set or class of men, can check a movement of this kind by preaching conservatism. We have seen how

strenuously the leading manufacturers endeavored to check the rising tide by taking contracts for all kinds of materials at such low prices that constant surprise was elicited because the huge volume of business apparently had no effect on values. At the same time assurances were being given quite authoritatively that no danger of a scarcity in iron and steel need be apprehended, as the capacity for production was so enormous. But this capacity was gradually taken up, and we have now been treated to the spectacle of a market without a regulator, bound no one knows whither. It is not like 1879-80, because at that time America was the sole buyer and Europe was an eager seller. Great Britain had enormous stocks of pig iron, from which shipments were made to us in such quantities that the scarcity here was speedily supplied. The world is now bare of stocks everywhere, and Europe is drawing from our producers instead of helping to supply our deficiency.

Under these circumstances, what is a buyer to do? How shall he know when a safe limit is reached in prices? He can only watch the market carefully and look for signs of economy among the people generally. The value of any commodity is what it will fetch, and as long as it continues to move the price is not too high. This limit may be reached far above the present range of prices, or it may be only a little above. No one can tell. But those only will reap the full advantage of present conditions who are both confident and watchful. The past has gone completely, and its traditions should be swept out of memory in trying to solve the problem of to day's conditions.

SPECIAL ENGLISH CORRESPONDENCE.

COMMUNICATED BY NORTON H. HUMPHRYS.

SALISBURY, ENGLAND, March 10, 1899.

The Parliamentary Inquiry as to the Use of Water Gas.—The Society of Arts and Acetylene.

The report of the Committee appointed by the Home Office to inquire into the effect of allowing water gas to come into general use, and what restrictions, if any, should be placed upon it, has been published. The constitution of the Committee is remarkable for leaving the practical element out of the question. Gas engineering and gasfitters are not represented at all. Possibly this was intentional, with a view of maintaining perfect independence, and from a fear that the technician would have a keener eye to the interests of the trade than to those of the public. This of course is purely a surmise, but it is quite in accordance with the usual attitude adopted by the Government towards the manufacturing interests generally in this country. The manufacturer is treated as a sort of a respectable criminal, who does not hesitate to fatten himself at the cost of his neighbor's health and comfort, and would shorten the average span of life considerbly if allowed to pursue his career unchecked. And so he is continually subject to the espionage of a small army of inspectors, who test the liquids issuing from his drain pipes, the gases from his chimneys, and any solid residues that may accumulate, with a view to preventing the contamination of water, earth or air. In many cases the manufacturer can point out that the laws are more of a scientific nature than of a character adaptable to practical circumstances, and that the inspector, while carefully observing the mote in one form, fails to perceive the beam in another. An old proverb says that "Providence takes care of fools and madmen;" but the modern legislator seems to believe that it is the special duty of a government to undertake that office. Such is the tone in which the Home Office Committee have approached the question of water gas. Their report is a very capable one in a scientific sense. They have spared no pains in the collection of data and in undertaking special experiments. But yet their conclusions are just of that character that brings science into disrepute amongst "unscientific"—that is to say, at least nine tenths of the total population.

They held 12 sittings, and examined 24 witnesses, including some of the best known authorities both of coal and of water gas. As a result, they hold that the use of water gas will increase, and make seven recommendations. They even anticipate the time when plain blue gas may be distributed, the incandescent burner having meanwhile found general acceptance, as their first proposal is that no person shall be allowed to make or distribute poisonous gas which does not possess a distinct and pungent smell. Considering that no one has ever proposed such a thing, and that no prospects in that direction are at present in view, this seems rather superfluous. It would be difficult to make any gas on the large scale that should be absolutely odorless. They next suggest that applicants for statutory powers should be required to state in their application the kind of gas they propose to sell, whether coal gas, carbureted water gas, plain water gas, or other variety, separate or mixed. As the first two are the only varieties that have as yet come before Parliament, this, like the first, appears to hark a long way ahead. And it does not appear to have occurred to the Committee that, after tying a manufacturer closely in respect to price, quality, etc., considerable hardship might follow the infliction of arbitrary restrictions as to the kind of material to be used. A company entitled to make only coal gas might be unable to take advantage of cheap oil, and therefore compelled to lose money, or to charge the customers 50 per cent. more than would be required under more reasonable terms. The third and fourth recommendations stipulate that public notice must be given before commencing to distribute water gas, and that as long as any water gas is present in the supply the fact shall be stated on every demand note. Further, records are to be kept of the proportion of water gas supplied, to be open at all times to public inspection, and to be published quarterly. These are so absurd as to make it doubtful whether they are expected to be taken seriously, or are simply introduced as a means of increasing the difficulties in the way of taking up water gas. Very few of the consumers would appreciate the information in its right and correct light. Many would take umbrage, and consider the gas company meant to take them at an advantage in some way or other. The more ignorant would take fright and decide to have no gas at all. How many consumers would, as a matter of public interest, call at the gas works to peruse the daily statistics. The Committee also appear to have imbibed the idea that a different kind of gas is, or can be, supplied in the day to that supplied at night, and to imagine that it would be possible to turn on another brand at 11 P. M. or other desired hour. Then the fifth and sixth clauses introduce a "Central" department, who amongst other things, are to limit the proportion of carbonic oxide in the gas at night, to 12 per cent., or such greater amount as they may consider desirable, and to deal with the character of the gas burners and fittings. The last clause provides for an inspector who shall test the gas for carbonic oxide and publish the results periodically. So the consumer, besides the advance warning, gets a notice on his bill, the right of entry into the gas works office to inspect certain books, a quarterly report in his local news-sheet, and his own inspectors report besides. All of which means addittional expense, and upon whom will it eventually fall?

The report, though ostensibly prepared in the interests of the public, is really directed to the protection of the foolish and the reckless, who, Carlyle notwithstanding, are only a small minority. The Committee seem to have been confronted all through with the risks incurred, not by the average consumer, but by the fool who persists in using unsound fittings, and by the madman who blows the gas out, instead of turning off the tap, before retiring to rest. Their report shows clearly enough that the so-called dangers of water gas are confined to leaky fittings and to accidental cases of leaving the tap on at night. The central department, the daily analysis of the gas, the costly routine at the gas works, etc., all shoot very wide of this mark. Gasfittings can be made sound in the first place and capable of remaining so for any reasonable length of time. But, unfortunately, light sections of pipe, hinges and swing joints that are described as "brass," but are more like gingerbread, and unskilled, inexperienced labor, are cheaper in first cost than good, strong materials and competent labor. The exertions of the carbonic analyst would be much more profitably applied to investigations as to the economies of good and bad fittings. A few statements on the lines of first cost plus the loss by leakage during five years' ordinary service, would be of more benefit to the consumer than the right to go down to the gas office and peruse the daily working records. Accidents due to the misuse of taps have not been sufficiently numerous in this country to call for special legislation, but if such is necessary the same arguments apply. A notice attached to the gas fixture, or a special device to render such an occurrence as the accidental turning on of the tap, while presumably shutting it off, an impossibility, would touch directly upon the point at issue.

Water gas has been supplied, mixed with coal gas, in various proportions up to half and half, during the last seven or eight years, in several populous districts throughout the country. But the public are slow to move, and somehow or other they have not availed themselves so freely of the lethal properties of the carbonic oxide, as the Committee think they may be expected to. In fact, with the exception of one or two cases that were brought up during the Liverpool scare, no evidence showing the necessity for legislative interference can be found in this country. And so the Committee had to dress up a case, out of scientific data and statistics collected from abroad, to show what might happen. But I can scarcely think that our legislature will consent to add to the already heavy responsibilities of gas manufacturers, in the absence of actual direct evidence as to the necessity for such additions.

Early last summer I directed attention to the exhibition of acetylene generators, etc., to be held at South Kensington, under the auspices of a committee appointed by the Society of Arts, and the report of that

committee has been published. They have granted certificates in respect to apparatus that complied with their tests, which included 30 days' consecutive working, and they consider that, with ordinary precautions, the use of acetylene is not more dangerous than that of other artificial lighting agents. Of course, other apparatus not submitted for inspection may possibly be equally as good, but they point out that the certificate is in some sense a credential as to the efficiency and reliability of the apparatus. The yield of acetylene is in all cases considerably short of that shown to be possible by theory. Of the non-automatic generators only one averaged about 5 cubic feet per pound of carbide consumed, the others showing much less. Of the automatic generators only three exceeded 4.5 cubic feet, and the others ranged from just under 4.5 cubic feet down to 3.5 cubic feet per pound of carbide. The carbide used for the experiments, which was supplied by the Acetylene Illuminating Company, was of excellent quality throughout, and alto gether these experiments were conducted under more favorable conditions than are likely to obtain in ordinary everyday working. So it is evident that data based upon a yield of 5 to 5¼ cubic feet of gas per pound of carbide is altogether misleading and untrue. As with electricity, the parties interested in acetylene have claimed too much. When they talk about producing something that is 15 times the value of coal gas as regards illuminating value, or equivalent to coal gas at 2s. 6d. per 1,000 cubic feet in the matter of price, they are making claims that will not be approached in practice, and therefore only tend to bring acetylene into discredit. Another important point brought out by the committee is that the apparatus should be of ample size according to the number of lights to be supplied, as overworking or two rapid generation leads to excessive heating of the apparatus. They advise that every apparatus sold should be accompanied by a written guarantee showing the quantity of gas it is capable of producing without heating in any part to a temperature of 228° F. Carbide should be stored in closed receptacles in dry, well-ventilated places, and so long as these precautions are observed, does not present any special element of danger. They prefer that acetylene should not be generated in a dwelling house, and that in all cases the apparatus should include purifying vessels for removing ammonia, sulphureted and phosphureted hydrogen and other impurities. All of which goes to show that the manufacture of acetylene means something more than dropping carbide into water, and is an operation that can scarcely be intrusted to ordinary intelligence. The use of purifiers involves a knowledge of the chemical principles concerned and ability to test the gas for impurities.

ITEMS OF INTEREST FROM VARIOUS LOCALITIES.

MR. A. L. RICE, Superintendent of the Riverside (Cal.) Gas and Electric Light Company, notes that the assessment levied some time ago on its shares, which assessment was referred to in the JOURNAL for the 6th inst., is easily explainable. The Company for some time has been engaged in a contest for business with the local authorities who are operating an electric lighting plant on municipal account. The authorities are furnishing electric lights at prices that are certainly not equal to one-half the cost thereof, which fact is incontestably shown by their admissions that during the last two years their trading has resulted in a loss of $20,000. Meanwhile the gas section of the Riverside Company's business shows a satisfactory advance, and Superintendent Rice is now engaged in completing a considerable extension to the main system.

MR. J. A. MCCOLLUM has been appointed Superintendent of the Florence (Ala.) Gas Light and Fuel Company.

MR. WM. M. PARKER, writing under date of the 13th inst., from New Whatcom, Washington, says that the Bellingham Bay Gas Company is to install a double superheater Lowe water gas set of apparatus, up to a capacity of 125,000 cubic feet per day. The Western Gas Apparatus Construction Company was awarded the contract, and the agreement is that the apparatus is to be ready for operation next July. The requirement for large quantities of fuel gas by the several salmon canneries during the fishing season have made this installation necessary.

A CORRESPONDENT at Reading, Pa., writing under date of the 15th inst., says that the gas stove contest inaugurated by the Consumers' Gas Company, of Reading, has far exceeded the expectations of its promoters. The contest was started February 1st, and up to March 15th there had been given out 35,000 coupons, and by the time the contest closes (the 25th inst.) it is quite certain the number issued will not have been less than 60,000. The Company finds that this experiment is the cheapest and best form of advertising it has ever tried. The Company is giving practical demonstrations of cooking by gas in its model kitchen daily, from 3 to 4:30 P. M. The housekeepers of the city appreciate these demonstrations very much. The contest is being supervised by Mr. Theo. M. Keppelman, manager of the Company's stove department.

THE Delaware Gas Company, to manufacture and supply gas for light only in the boroughs of Easton and West Easton, Pa., has been incorporated by Alfred Clark, Lowell, Mass.; Arthur B. Childs, Boston, Mass.; and Henry McKeen, Edward J. Fox and S. S. Yohe, Easton, Pa. It is capitalized in $200,000.

THE citizens of Tiffin, Ohio, will vote, on April 3d, whether or not to grant to Kern Brothers, of Toledo, O., a franchise to construct and operate an artificial gas plant in that city.

IT is reported that the Warren County Gas Company, of Phillipsburg, N. J., has been purchased by a syndicate, the chief members of which are Edward C. Jones, of the banking firm of Jones & Co., New York, and Liddon Flick, of Wilkes-Barre, Pa.

WE understand that Messrs. Wm. T. Morris, J. B. Bradley and E. C. Bradley, of Penn Yan, N. Y., have purchased the plant and franchises of the Van Wert (O.) Gas Light Company—the purchase also includes the acquirement of 17 miles of natural gas mains. It is said that Mr. Morris and his associates will enlarge the generating capacity of the plant.

THE new schedule of wages for employees in the Wheeling (W. Va.) municipal gas and electric light works is as follows: Gas plant, chargers, $2.20; stokers and "mud" men, $2; electric light plant, firemen, $2.25; assistant firemen, $2; laborers, $2.

MESSRS. HELME & MCILHENNY, of Philadelphia, have completed a 12-foot station meter for the Consumers Gas Company, Reading, Pa.

"J. L. H." writes that the Colorado Springs (Col.) Light and Power Company has taken over the properties of the Colorado Springs Gas and Electric Company. The officers of the reorganized concern are: Directors, I. Howbert, F. H. Morley, H. Hall, I. W. Bonbright and George R. Buckman; President, I. W. Bonbright; Secretary and Treasurer, George R. Buckman. The gas plant will be remodelled, if not rebuilt, and the reconstruction will likely be carried out under the advice of Mr. Frank D. Moses.

THE Honorable Randall Montgomery has been elected General Manager of the Youngstown (Ohio) Gas Company, vice the late Mr. Bradner P. Holmes.

IN the suit of the Oneida (N. Y.) Gas Light Company against a contractor named Marsden, for $100 damages caused to the Company's mains through the negligence of Marsden while laying a sewer through James street, the defendant agreed to a compromise, the sum received in settlement being equal to one-fifth of the claim. Although the case was a small one, the result is well worth recording because of the principle involved.

JAMES W. LANNING has been awarded the contract for the construction of the office building of the Trenton (N. J.) Gas and Electric Company. The structure is to be located on East State street, close to the Post Office, and is to have the dimension of 40 by 62 feet. Only two stories are arranged for, but the height of the building is set at 40 feet. The premises will be occupied entirely by the Company, and the contract calls for the completion of the structure by July 1.

THE following extract from the annual message of Mayor Sweeney to the City Council of Wheeling, West Va., is worth reading—the italics are ours: "From the best obtainable figures the *revenues* of the gas works for the current year will fall short of the estimated expenditures, *including the electric light maintenance*, approximately $3,000. This deficit is due largely to the competition in the sale of the bye-products, necessitating a material reduction in price. It has been the custom for all city departments to receive gas free of charge, a custom that should never have obtained, for it does the gas works injustice and does not properly represent the cost of the other departments. In my opinion each city department using gas should pay the gas works upon a basis of the actual cost. The value of the gas furnished the departments last year, on a basis of 50 cents per 1,000, was $3,023.60, or *more than sufficient* to make up the estimated deficit for this year."

A CORRESPONDENT in Richmond, Va., writing under date of the 19th inst., says that the City Council of Danville, after much debating, has decided that, on and from the 1st prox., the gas rate in that city shall be $1 per 1,000 gross, with a rebate of 25 cents per 1,000 to those who promptly pay their bills. The discount period was put at 5 days.

A PROPOSITION (at least as far as the securing of a charter is concerned) to establish a gas works in Lakeville, Conn., is underway. This place, which is a post village of Salisbury township, Litchfield county, Conn., and which is 50 miles west by northwest of Hartford, and 30 miles southeast of Hudson, N.Y., is altogether too small to support a gas works of the regular order.

IT is said that the Highway Commissioner of Tuckahoe, N. Y., has granted a franchise to the Westchester Gas and Coke Company for the right to construct and operate a gas works in the place named for a period of 99 years. Tuckahoe is a small village on the line of the New York and Harlem Railroad, located about midway of Mount Vernon and White Plains, and it is in about as much need of a separate gas and coke company as J. Pierpont Morgan is in need of more money. It is evidently an entering-wedge proposition.

THE Providence (R. I.) *Journal* of recent date says that the Providence Gas Company has just completed plans for the construction of two new buildings and one addition to one of its present buildings, the scheme involving the outlay of about $50,000. On the southeast corner of Allen avenue and Public street, a 3-story structure, 176 feet by 40 feet, is to be erected. It will be devoted largely to housing an extensive purifying system, the balance of the space being allotted to office and storage purposes. Opposite this another building, 110 feet by 65 feet, will be erected, which is intended to house additional generating apparatus.

THE following is the text of the bill under which it is proposed to operate an opposition gas works in Nashville, Tenn.:

Section 1. That the Tennessee Gas Company is authorized to construct and operate gas works in Nashville and to manufacture and sell gas and to lay all the necessary attachments below the surface of the streets. To erect and maintain all necessary posts for lamps, and to make connections for consumers with pipes, etc., provided that all excavations in said streets shall be made under the supervision of the Board of Public Works and Affairs. Said streets, pavements, etc., shall be replaced and repaired in as good condition as before.

Sec. 2. Should said grantees fail or refuse to repair said pavements, etc., within reasonable time, then the same may be replaced by the city at the cost of said grantees. Before any excavations are made by said grantees at any time, it shall be their duty to apply for a permit, which permit shall state the particular lane or highway where said work is to be done, and the length of time to be done thereunder.

Sec. 3. Under the permission and authority granted, said grantee shall furnish good commercial gas, which shall, burning 5 feet per hour, be capable of producing a light equal to that produced by 22 standard sperm candles, and suitable for illuminating, heating and mechanical purposes. The rate to be charged by said grantees for private consumption shall not exceed, for lighting purposes, $1.40 per 1,000 cubic feet, with 10 cents per 1,000 cubic feet discount for prompt payment ($1.30 net), and for fuel, $1 net.

Sec. 4. The rate to be charged to the city for gas for all purposes shall not exceed 75 cents per 1,000.

Sec. 5. Said grantees shall not open or encumber at any one time more of any public highway than may be necessary to enable them to proceed with advantage.

The remaining sections deal with the rights of the proposed gas company in the discharge of its duty after its plant is installed, etc. A bond of $10,000 is to be given that, within 18 months, $300,000 will have been expended by grantees in Nashville to construct and equip a gas plant, on receipt of which statement, from the City Engineer, that such sum has been expended, the bond of $10,000 is to be returned.

THE Tennessee Company's proposed onslaught in Nashville might be considered a joke, were it not for the fact that the Nashville City Council is hungry. Meanwile, the Snyder-Sweetman combination that had such good luck in Kansas City, Mo., which combination is behind the Nashville raid, should remember that pride goeth before a fall.

THE Augusta (Ga.) *Chronicle*, of recent date, says: "There are several parties in Augusta who are trying to buy the stock of the local Gas Light Company. It is understood that before the charter was filed by Judge French and others for the incorporation of an opposition lighting and heating company, the Judge had offered to buy a controlling interest in the Gas Light Company of Augusta." From this we might judge that French, having failed in his bid on a commercial basis, is now ready to do business with the local authorities, or with those of them who have the right to say whether or not another franchise for a gas company shall be granted.

ON April 1st the net price of gas in the Newark (N. J.) district will rule at $1.10 per 1,000 cubic feet—a concession of 10 cents per 1,000. Mr. B. M. Shanley, President of the Essex and Hudson Gas Company, which is the name of the Company doing business now in the Newark section, hopes that by April 1st, 1900, the rate will be $1 per 1,000.

Correspondence

[The JOURNAL is not responsible for the opinions expressed by correspondents.]

President Crockett and the Hall Process.

The following letter, which is authentic in every particular, explains itself:

THE SAN FRANCISCO GAS AND ELECTRIC COMPANY,
SAN FRANCISCO, CAL., March 14, 1899.

Mr.....: Dear Sir—I received your letter asking for information regarding the "Hall Process," and in answer thereto I would say that, in my own judgment, it has absolutely no merit, and is like all of those processes which are commonly known by gas men as "greased wind." At one time known as the "Proctor Process," and again as the "Hall Process," it is now being worked here by a gentleman named Dr. Chisholm. So far they have expended about $200,000 in the erection of works, and have put in two small holders of 160,000 cubic feet capacity each, which they claim will deliver not less than 4,000,000 or 5,000,000 feet in 24 hours.

Their great claim is that they make a gas of very low candle power, not to exceed 11 candles, in the making of which they use 2½ gallons of oil and about 15 to 16 pounds of coal per 1,000 cubic feet. The rest of the gas is made up of air which is forced through the apparatus under a tremendous pressure. The gas, under an ordinary pressure and with a common burner, will not burn more than about ½-inch high, and can only be used to advantage in a Welsbach burner under pressure of almost 6 inches, the burner giving off a hissing sound all the time, and necessitating the frequent renewal of the mantles. The result is that they get a gas which, burned in a Welsbach burner, gives an illuminating power of about 65 to 70 candles and consumes in the neighborhood of 9 feet of gas. When the pressure is down the candle power is reduced. When the same candle power can be obtained from our gas with a consumption of 2.4 feet as is obtained from their's with a consumption of 5 feet, the thing appears to me to be of no value, because, even though they are selling gas at $1 per 1,000, it takes twice as much of their gas to accomplish the same results that it does of ours. This must be so, for from the chemical analysis of their gas you will find that they have 64 per cent. of non-combustible matter in the shape of nitrogen, etc. I enclose herewith analyses[1] of their gas which show about the average result of tests made over a period of about 50 days. I send you also a copy of a newspaper giving the details of a test made at our laboratory, at which Mr. Ackerman (its President) and Dr. Chisholm of the Equitable Company were present. I suppose you received one of the circulars from the *Financial Letter*, a San Francisco publication, which seems very active in trying to promote the success of this scheme. However, I do not think you need keep awake nights worrying about the "Hall Process,"—I have thought so little of it that I have not even made an attempt to stop it.

Another of their great claims is that it is a great heating gas; but when we worked it out theoretically is showed about 330 British thermal units. When tested by a calorimeter we got about 308 heat units, whereas our gas under the same conditions gave about 630. They are now laying some 20 inch pipe, which is rendered necessary by the fact that their gas is of a specific gravity of .980. So far they have taken about 90 consumers from us, and have put in about 187 services. They have never put meters on their consumers, because I am satisfied they fear that if they ever do it will be shown that they burn much more gas than they claim.

Our old friend, Mr. Wm. Wallace Goodwin, who is now operating a small works of the same sort at Kalamazoo, professes to have discovered some wonderful change which takes place in the nitrogen, whereby it becomes a nitrous oxide, giving it an immense number of heat units, which so far we have been unable to discover.

After the test was made at our place they became so angry that they cut off the service at the street main to prevent our testing the gas again, but as we had tested it for almost two months it did not make much difference.

Trusting that this will give you the desired information, I remain, yours very truly,

J. B. CROCKETT,
President San Francisco Gas and Electric Co.

1. The analyses reported by Mr. Crockett are as follows:

Analysis of Equitable (Hall) Gas.

	No. 1—Jan. 30.	No. 2—Feb. 27.		No. 1—Jan. 30.	No. 2—Feb. 27.
Carbonic acid..	6.7 per cent.	7.4 per cent.	Hydrogen.....	7.7 per cent.	12.7 per cent.
Illuminants....	9.0 "	6.3 "	Marsh gas.....	12.0 "	9.7 "
Oxygen.....	0.4 "	0.4 "	Nitrogen.....	56.9 "	52.1 "
Carbonic oxide.	7.3 "	11.4 "			
		Total.....		100.00 "	100.00 "

THE AMERICAN GAS LIGHT JOURNAL

MONDAY, MARCH 27, 1899.

The Market for Gas Securities.

The state of the city gas share market at the present writing is, to say the least, pretty well mixed. The developments in the contest for new business, together with the action last night (Thursday) of the Senate Committee on Miscellaneous Corporations, in agreeing to report adversely the bill incorporating the Astoria Company, caused a sharp break in Consolidated, which sold to-day at 202. The closing figure was 202¼ to 203.

Those acquainted with the vagaries of legislators and legislatures are not satisfied that the adverse report of the Committee means an ending of the bill; but it might be well to remember that in this contest a tunnel under the East River is not necessary to the intact maintenance of the properties of the Consolidated Company. New Amsterdams are rather stronger, but not on their merits. Mutual is in some demand. On the whole, the situation in this city is such that it looks the better policy to watch and to wait.

Brooklyn Union is remarkably strong, but not more than its merit warrants. Peoples, of Chicago, is well above 120, and its owners are satisfied to hold rather than to sell. Lacledes are showing development in strength, and Bay State is 2¼ to 3. Western, of Milwaukee, advances steadily, and Baltimore is 70 to 71.

Gas Stocks.

Quotations by George W. Close, Broker and Dealer in Gas Stocks.

16 Wall Street, New York City.

March 20.

☞ All communications will receive particular attention. ☜ The following quotations are based on the par value of $100 per share.

N. Y. City Companies.	*Capital.*	*Par.*	*Bid.*	*Asked.*
Consolidated	$39,078,000	100	203¼	203
Central Union, Bonds, 5's.	3,000,000	1,000	107½	108½
Equitable Bonds, 6's	1,000,000	1,000	105	..
" 1st Con. 5's	2,300,000	1,000	114	.
Metropolitan Bonds	658,000	..	108	112
Mutual	3,500,000	100	316	325
" Bonds	1,500,000	1,000	100	102
Municipal Bonds	750,000	.	..	
New Amsterdam Gas Co.	13,000,000	100	40¾	41
Preferred	10,000,000	100	68¼	68¾
Bonds, 5's	11,000,000	1,000	103¼	104
Northern Union, Bonds, 5's.	1,250,000	1,000	94½	95½
New York and East River..				
Bonds 1st 5's	3,500,000	1,000	111	113
" 1st Con. 5's	1,500,000	..	107½	108½
Richmond Co., S. I.	348,650	50	70	..
" Bonds	100,000	1,000	..	..
Standard	5,000,000	100	135	138
Preferred	5,000,000	100	150	155
Bonds, 1st Mortgage, 5's	1,500,000	1,000	112	114
Yonkers	299,65	500	180	..
Out-of-Town Companies.				
Brooklyn Union	15,000,000	100	150	164
" " Bonds (5's)	15 000,000	1,000	118	.
Bay State	50,000,000	50	2¾	3
" Income Bonds	2,000,000	1,000	..	75
Binghamton Gas Works	450,000	100	..	..
" 1st Mtg. 5's	450,000	1,000	..	.
Boston United Gas Co.—				
1s Series S. F. Trust	7,000,000	1,000	92	..
2d " " "	3,000,000	1,000	..	80
Buffalo City Gas Co.	5,500,000	100	..	14
" " Bonds, 5's	5,250,000	1,000	93	93½
Central, San Francisco	2,000,000	..	105	..
Chicago Gas Co. Guaranteed Gold Bonds	7,350,000	1,000	104	104¼
Columbus	1,144,700	100	70	75
1st Mortgage	1,207,000	1,000	101	103½
Consumers. Jersey City	2,000,000	100	88	..
" Bonds	600,000	1,000	104	106
Cincinnati G. & C. Co.	8,500,000	100	209	210
Consumers, Toronto	1,700,000	50	230	235
Capital, Sacramento	500,000	50	..	35
Bonds (6's)	150,000	1,000	..	..
Consolidated, Baltimore	11,000,000	100	70	71
Mortgage, 6's	3,600,000	..	107	107½
Chesapeake, 1st 6's	1,000,000	..	..	..
Equitable, 1st 6's	910,000	..	..	..
Consolidated, 1st 5's	1,490 000	..	..	..
Consolidated Gas Co. of N.J.	1,000,000	100	15	17
" Con. Mtg. 5's	380,000	1,000	80	82
Consolidated G. & E. Co.'s., Little Falls, N.Y.	90,000	100	..	100
Bonds	75,000	..	..	100
Detroit City Gas Co	4,560,000	50	65	65½
" Prior Lien 5's	4,546,000	1,000	94¼	94½
Detroit Gas Co., 5's	423,000	1,000	95½	96
" Inc. 5's	31,000	100	..	..
quitable Gas & Fuel Co., Chicago, Bonds	2,000,000	1,000	..	101
Fort Wayne	2,000,000	..	68	70
" Bonds	2,000,000	..	80	82
Grand Rapids Gas Lt. Co.	1,000,000	50	..	..
" 1st Mtg. 5's	1,125,000	1,000	..	.
Hartford	750,000	25	..	145
Indianapolis	2,000,000	..	100	105
" Bonds, 6's	2 650,000	..	105	106
Jackson Gas Co	250,000	50	..	..
" 1st Mtg. 5's	250,000	1,000	..	..
Jersey City	750,000	20	210	..
Lafayette Gas Co., Ind.	1,000,000	100	68	70
Bonds	1,000,000	1,000	81	86
Louisville	2,570,000	50	106	108
Laclede, St. Louis	7,500,000	100	54¼	54¾
Preferred	2,500,000	100	100	101
Bonds	10,000,000	1,000	107½	108
Madison Gas & Elec. Co.	400,000	100	..	..
" 1st Mtg. 6's	350,000	1,000	..	..
Montreal, Canada	2,000,000	100	200	..
Newark, N. J., Gas Co.	1,000,000	..	200	220
Bonds, 6's	4,000,000	..	128	130x
New Haven	1,000,000	25	252	..
Nashville Gas Lt. Co.	1,000,000	50	110	..
Oakland, Cal.	2,000,000	..	53½	55
" Bonds	750,000	..	..	..
Peoples G. L. & Coke Co., of Chicago	25,000,000	100	121	121¼
Peoples Gas Lt. & Coke Co., Chicago, 1st Mortgage	20,100,00	2,000	111½	112
2d "	2,500,000	1,000	104	105
Peoples, Jersey City	500,000	50	240	250
Rochester Gas & Elec. Co.	2,150,000	50	52	..
Preferred	2,150,000	50	103	..
Consolidated 5's	2,000,000	..	87½	90
San Francisco, Cal.	10,000,000	100	88½	89
St. Paul Gas Light Co.	1,500,000	100	30	32
1st Mortgage 6's	650,000	1,000	82	85
Extension, 6's	600,000	1,000	..	..
General Mortgage, 5's	2,428,000	1,000	80	82
St. Joseph Gas Co	1,000,000	100	..	..
" 1st Mtg. 5's	750,000	1,000	..	..
Syracuse, N. Y.	1,750,000	100	15½	17
Bonds	1,612 000	1,000	85	89
Washington, D. C	2,000,000	20	260	265
First mortgage 6's	600,000	..	..	..
Western, Milwaukee	4,000,000	100	97	97¾
Bonds, 5's	3,330,500	.	106	108
Wilmington, Del	550,000		208	..

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DIVIDEND NOTICE.

OFFICE OF THE UNITED GAS IMPROVEMENT CO., 813 DREXEL BUILDING, PHILA., PA., March 15, 1899.

The Directors have this day declared a quarterly dividend of 2 per cent. (one dollar per share), payable on April 15 1899, to stockholders of record at the close of business March 30. Checks will be mailed.

1241-4 EDWARD C. LEE, Treasurer.

WANTED,

A Second-Hand Set of King's Treatise on Coal Gas.

Address, stating price,
WM. H. FRAPWELL,
1242-1 Morristown, N. J.

Position Wanted

As Assistant Superintendent in Fair-Sized Gas Plant,

By a young man with 9 years' gas experience. A good gas seller. Excellent credentials. Address
1242-1 "W. F.," care this Journal.

WANTED,

By a Gas Company in New England,

A GOOD METER REPAIRER.

State experience, also wages required.
1241-4 Address "L." care this Journal

Position Wanted.

On account of changes made in my present Company, I will sever my connection therewith on February 20, and solicit correspondence with Gas Companies contemplating a change of management. Eight years with present Company. References.
E. G. HOLZER, Supt Gas Dept.,
1238-tf Roanoke Gas and Water Co., Roanoke, Va.

FOR SALE,

At Receiver's Sale,

One Gas Plant, Electric Light and Street Railway Plant.

A splendid opportunity for investors. For full particulars address
W. R. FABEN, Receiver,
1240-tf Defiance, Ohio.

SECOND-HAND APPARATUS.

I am in position to offer at attractive prices, a considerable quantity of good, usable second-hand Gas Apparatus, of various kinds and sizes, such as Purifiers, Station Meters, Exhausters, Scrubbers and Condensers, Bench Ironwork, Water Gas Machinery, Tanks, etc., etc. Gas Companies or Contractors who can use such will find it worth while to write for prices, stating their requirements. Gas Companies having apparatus to dispose of are invited to communicate upon the matter.
F. H. SHELTON,
Drexel Building, Phila.

FOR SALE.

A Second-Hand Set of Four Purifying Boxes, including dry Center-Seal—12-inch Connections, and **Two Hoisting Carriages.** Boxes are 12 feet by 18 feet by 3 feet 6 inches deep; are in good condition, and only sold because have been replaced by larger Boxes, and will be sold at a low price.

For terms, etc., address
PORTLAND GAS LIGHT CO.,
128-tf Portland, Me.

For Sale.

A Small Gas and Electric Light Plant,

in a Southern city of 3,800 inhabitants.

Address FORT WAYNE ELECTRIC CORPORATION,
1097-tf Fort Wayne, Ind.

Utilize Your Gas Liquor.

NO EXTRA LABOR OR OPERATING EXPENSES.

Ammonia Concentrator.

Not Expensive. Write to
STROH & OSIUS, Pat'ees, or
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Are universally used and recommended by leading Gas Companies of the world.

Every Burner stamped with name and Trade Mark. Take no imitations.

Made for high and low pressure. Send for description and prices, also for

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HUMPHREYS & GLASGOW,

BANK OF COMMERCE BLDG., 31 Nassau Street, New York.

9 VICTORIA STREET, London, S. W., England.

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GAS PROPERTIES PURCHASED.

GOODMAN

GAS MAIN STOPPER

For Shutting Off Gas in Mains Temporarily during Alterations or Repairs.

For Particulars Address

SAFETY GAS MAIN STOPPER COMPANY,

211 East 116th Street, New York.

A woman and a man

Often view matters from a totally different standpoint:

In endeavoring to induce people to use gas as fuel, it is necessary to interest the "LADY OF THE HOUSE."

The advertising should be addressed to her:

It should be such advertising as she will read.

Above all it should be ***ILLUSTRATED.***

A woman never reads any advertising matter that has no pictures in it.

It is because my advertising is illustrated by the best artists in America and presents the advantages of gas from a woman's standpoint, that so many gas companies find its use profitable.

Nearly one hundred gas companies, located in various parts of the United States, hire me by the year to write and illustrate advertising matter for them.

I am preparing the best advertising matter for gas companies in America.

You don't have to take my word for this, write me a letter and I will send you my leaflet telling what some of the brightest and shrewdest presidents, superintendents and managers of gas companies think about it.

I want to look after your advertising this year.

Advertising for Gas Companies

J. Howland Harding
1545 Broadway
New York City

W. H. PEARSON, Prest. W. H. PEARSON, Jr., Vice-Prest. J. T. WESTCOTT, M.E., Manager. L. L. MERRIFIELD, M.Inst.M.E., Chief Engineer

THE ECONOMICAL GAS APPARATUS CONSTRUCTION CO., LD.

American Offices: 269 FRONT STREET, EAST, TORONTO, ONT.
London Offices: 19 ABINGDON STREET, WESTMINSTER, S.W.

Telegraphic Address: "CARBURETED LONDON AND TORONTO."

The above Company have erected since 1893, or are now erecting, their universal type of Carbureted Water Gas Plants at the following Gas Works:

	Cubic Feet Daily.
Blackburn, Eng.	1,250,000
Windsor Street Works, Birmingham, Eng.	2,000,000
Saltley Works, Birmingham, Eng.	2,000,000
Colchester, Eng.	300,000
Birkenhead, Eng.	2,250,000
Swindon (New Swindon Gas Co.), Eng.	120,000
Saltley Works, Birmingham, Eng. (2d Contract)	2,000,000
Windsor Street Works, Birmingham, Eng. (Second Contract),	2,000,000
Halifax, Eng.	1,000,000
Toronto,	250,000
Ottawa,	250,000
Toronto (Second Contract, Remodeled),	2,000,000
Lindsay (Remodeled),	125,000
Belleville,	250,000
Ottawa (Second Contract),	250,000
Brantford (Remodeled)	200,000
St. Catherine's (Remodeled),	250,000
Kingston, Pa.	125,000
Montreal,	500,000
Peterborough, Ont.	250,000
Wilkesbarre, Pa.	750,000
St. Catherine's (Second Contract),	250,000
Buffalo, N. Y.	2,000,000
Winnipeg, Man.	500,000
Colchester, Eng. (Second Contract),	300,000
York, Eng.	750,000
Rochester, Eng.	500,000
Kingston, Ont.	300,000
Crystal Palace District, Eng.	2,000,000
Duluth, Minn.	300,000
Caterham, Eng.	150,000

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Globe
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Lamps.
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821-823 Eagle Av., N. Y.

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GAS ENGINEER
AND
CONTRACTOR,
Wayne Bank Building, - DETROIT.
GAS PROPERTIES PURCHASED.

The Gas Engineer's Laboratory Handbook.
By JOHN HORNBY, F.I.C.
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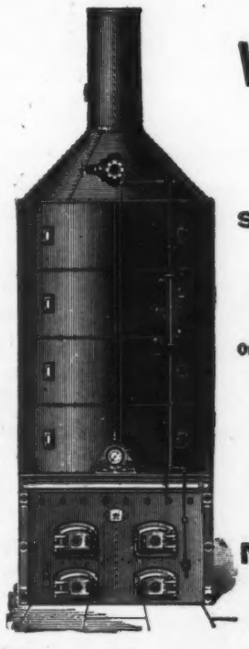

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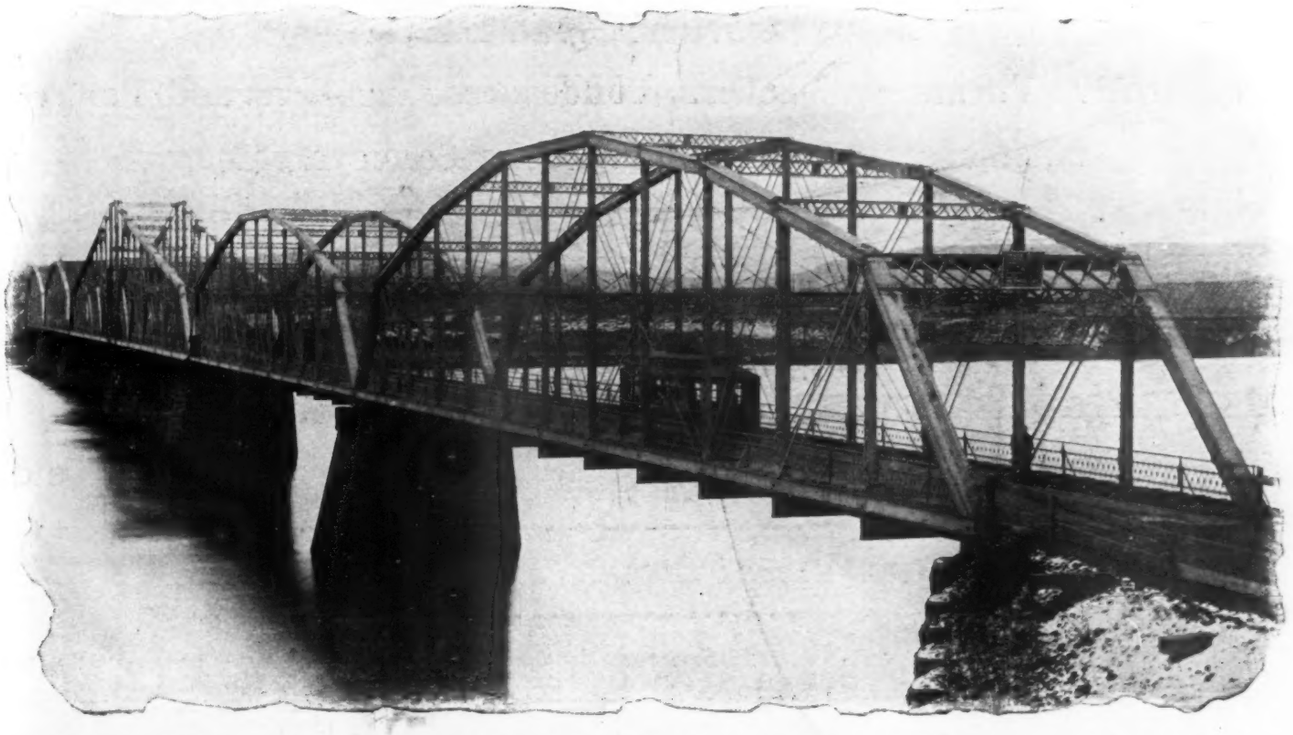

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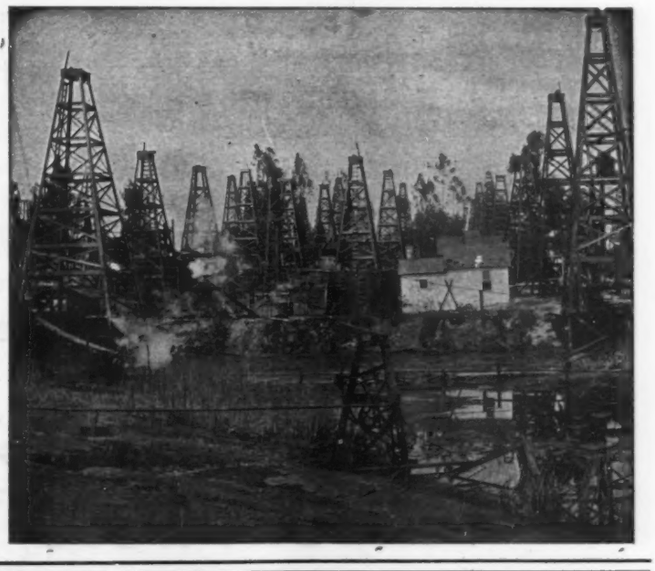

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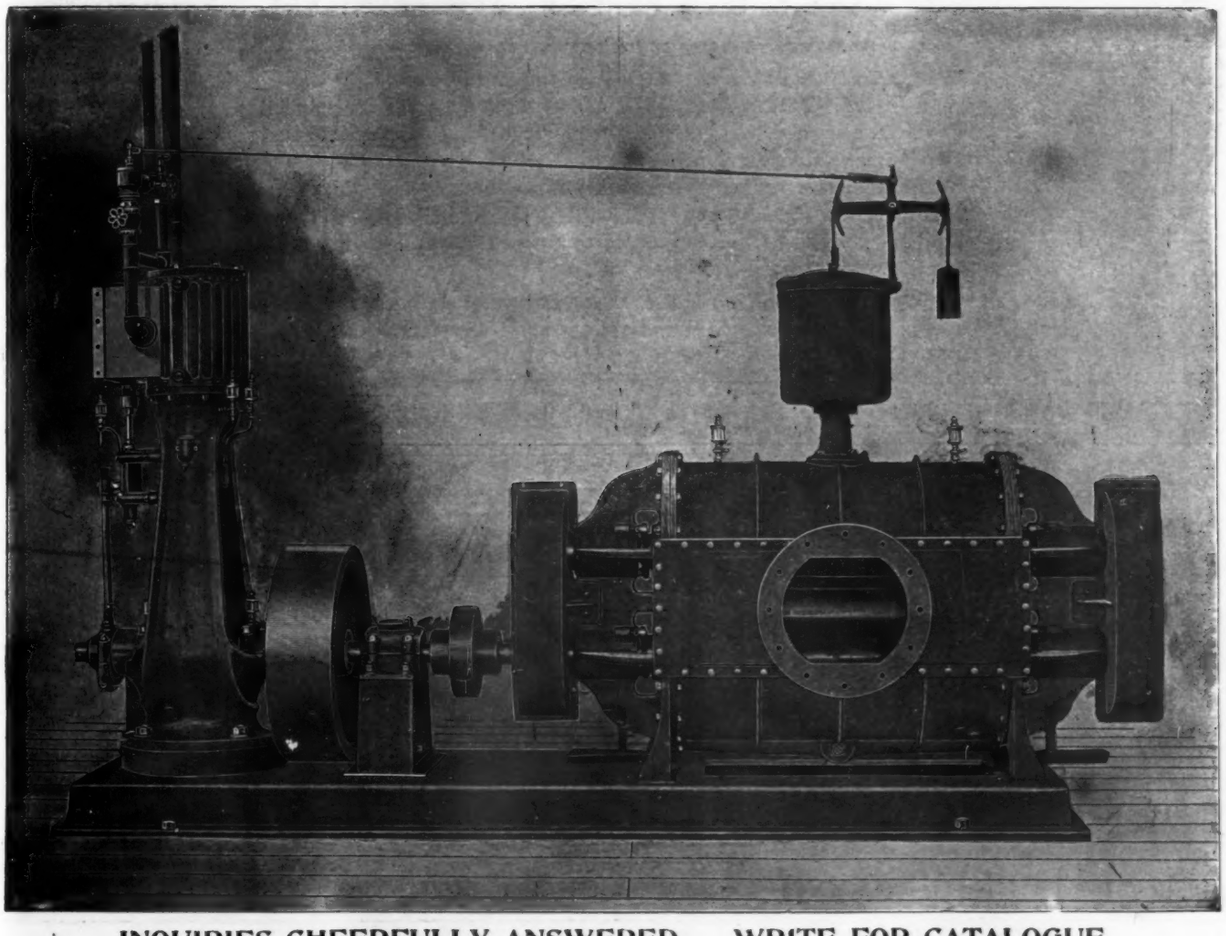

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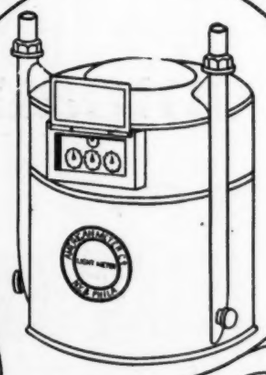
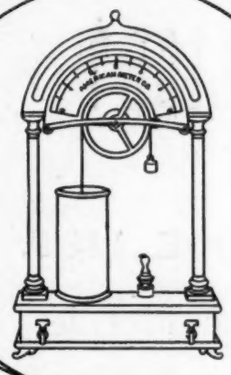
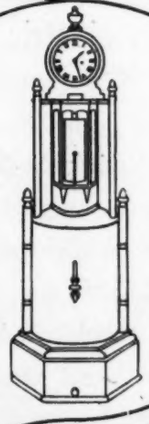
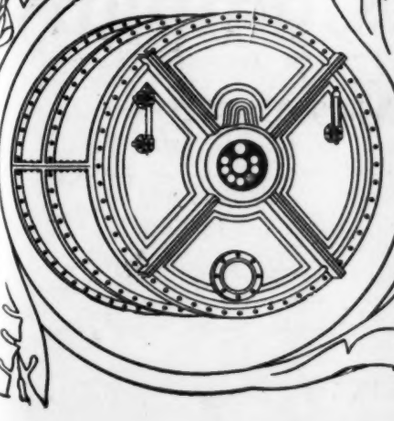




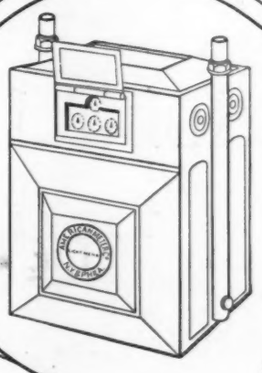


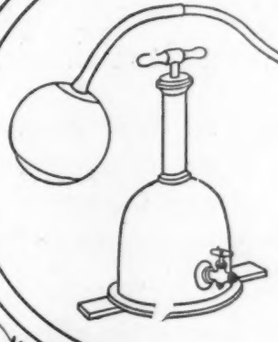


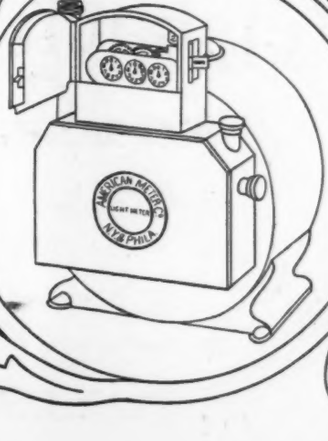
PUBLIC LIGHTING TABLE.

APRIL, 1899.

Day of Week.	Table No. 1. Following the Moon. Date.	Light.	Extinguish.	Table No. 2. New York City. All Night Lighting. Light.	Extinguish.
				P.M.	A.M.
Sat.	1	6.50 PM	1.30 AM	6.10	4.55
Sun.	2	7.00 LQ	2.20	6.15	4.40
Mon.	3	7.00	3.00	6.15	4.40
Tue.	4	7.00	3.40	6.15	4.40
Wed.	5	7.00	4.20	6.15	4.40
Thu.	6	7.00	4.30	6.15	4.40
Fri.	7	7.00	4.30	6.15	4.40
Sat.	8	7.00	4.30	6.15	4.40
Sun.	9	7.00 NM	4.30	6.25	4.30
Mon.	10	7.00	4.30	6.25	4.30
Tue.	11	7.00	4.30	6.25	4.30
Wed.	12	7.00	4.30	6.25	4.30
Thu.	13	7.00	4.30	6.25	4.30
Fri.	14	10.30	4.30	6.25	4.30
Sat.	15	11.20	4.30	6.25	4.30
Sun.	16	11.50	4.20	6.30	4.20
Mon.	17	12.30 AM FQ	4.20	6.30	4.20
Tue.	18	1.00	4.20	6.30	4.20
Wed.	19	1.20	4.20	6.30	4.20
Thu.	20	1.50	4.20	6.30	4.20
Fri.	21	2.10	4.20	6.30	4.20
Sat.	22	2.40	4.20	6.30	4.20
Sun.	23	3.00	4.10	6.40	4.10
Mon.	24	No L.	No L.	6.40	4.10
Tue.	25	No L. FM	No L.	6.40	4.10
Wed.	26	No L.	No L.	6.40	4.10
Thu.	27	7.20 PM	10.20 PM	6.40	4.10
Fri.	28	7.20	11.20	6.40	4.10
Sat.	29	7.20	12.20 AM	6.40	4.10
Sun.	30	7.30	1.00	6.45	4.00







TOTAL HOURS LIGHTING DURING 1899.

By Table No. 1.	Hrs.Min.	By Table No. 2.	Hrs.Min.
January	215.40	January	423.20
February	184.40	February	355.25
March	187.40	March	355.35
April	166.50	April	298.50
May	158.00	May	264.50
June	140.50	June	234.25
July	150.30	July	243.45
August	168.30	August	280.25
September	179.50	September	321.15
October	213.20	October	374.30
November	217.00	November	401.40
December	238.10	December	433.45
Total, yr.	2221.00	Total, yr.	3987.45

Welsbach Commercial Company,

DREXEL BUILDING,

PHILADELPHIA.

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Constructed During 1898

BY

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Cleveland, O.	3	8 ft. 6 in.	
Portland, Me.	1	7 ft. 6 in.	
Washington, D. C.	4	8 ft. 6 in.	
Philadelphia, Pa.	20	8 ft. 6 in.	
Norfolk, Va.	1	7 ft. 6 in.	(Second Contract.)
Trenton, N. J.	2	7 ft. 6 in.	
Flint, Mich.	1	4 ft.	
Jenkintown, Pa.	1	5 ft.	
Yonkers, N. Y.	1	8 ft. 6 in.	
Paterson, N. J.	1	8 ft. 6 in.	
Waterbury, Conn.	1	8 ft. 6 in.	
Chicago (Ogden Gas Co.)	1	8 ft. 6 in.	(Second Contract.)
LaFayette, Ind.	1	5 ft.	(Second Contract.)
Lynn, Mass.	1	7 ft. 6 in.	(Second Contract.)
Mt. Clemens, Mich.	1	4 ft.	
New Brunswick, N. J.	1	6 ft.	
Pittsfield, Mass.	1	5 ft.	(Second Contract.)
New York (East River Co.)	2	11 ft.	(Second Contract.)
Johnstown, N. Y.	2	6 ft.	
Waukegan, Ill.	1	5 ft.	
Chester, Pa.	1	6 ft.	(Second Contract.)
Somerville, N. J.	1	4 ft.	
Hackensack, N. J.	1	6 ft.	(Second Contract.)
Torrington, Conn.	2	5 ft.	
Glassport, Pa.	2	5 ft.	

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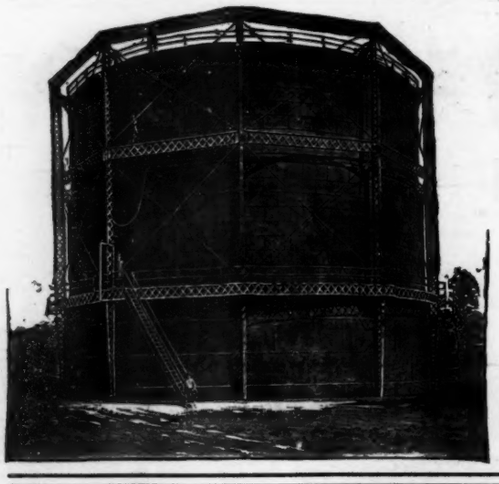

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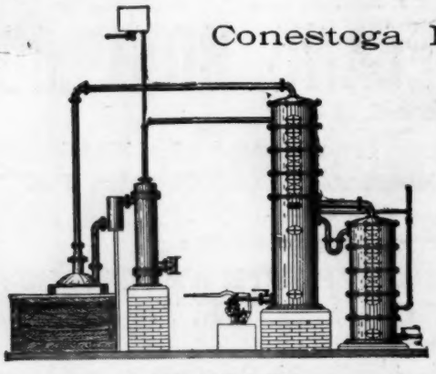

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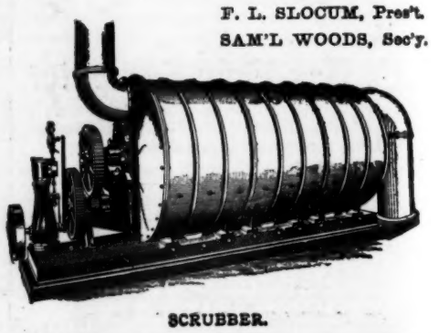

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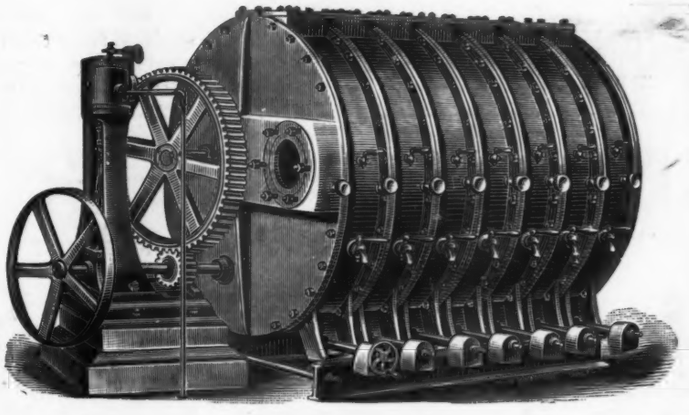

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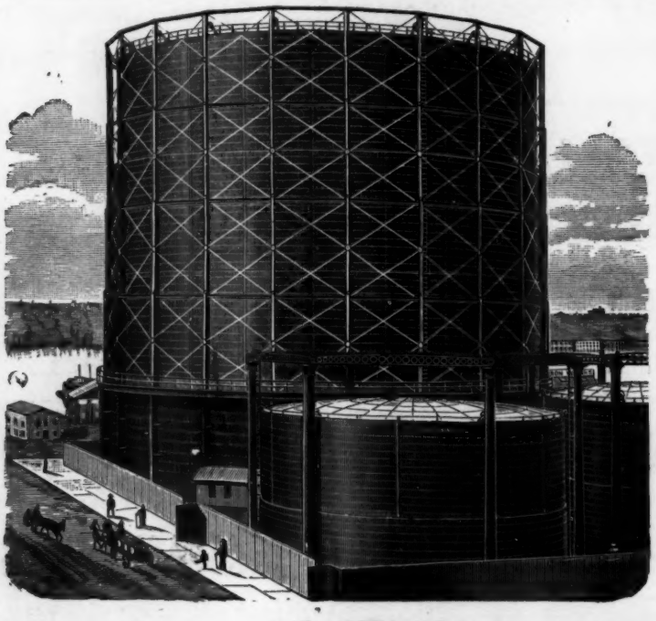

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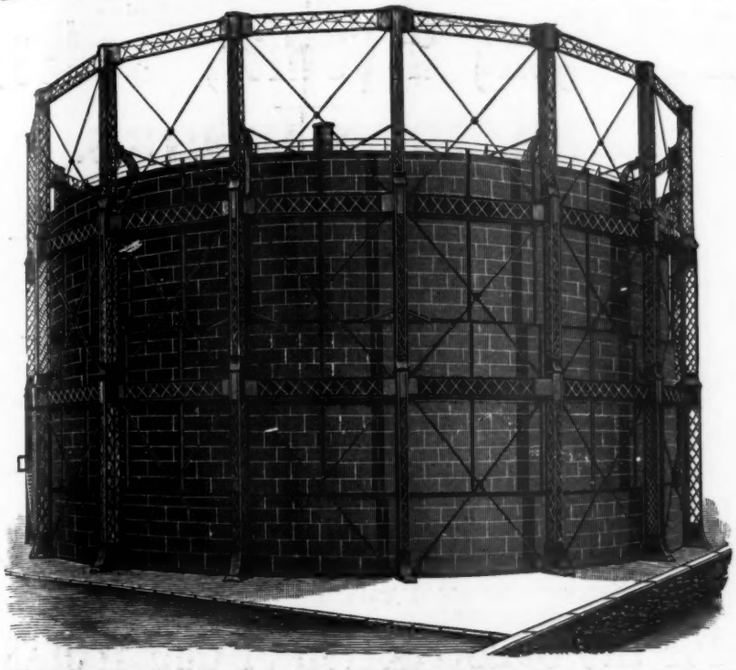

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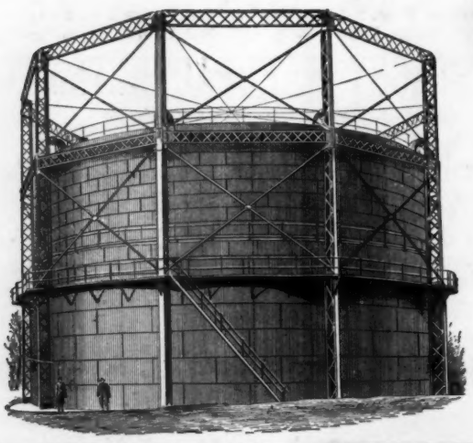

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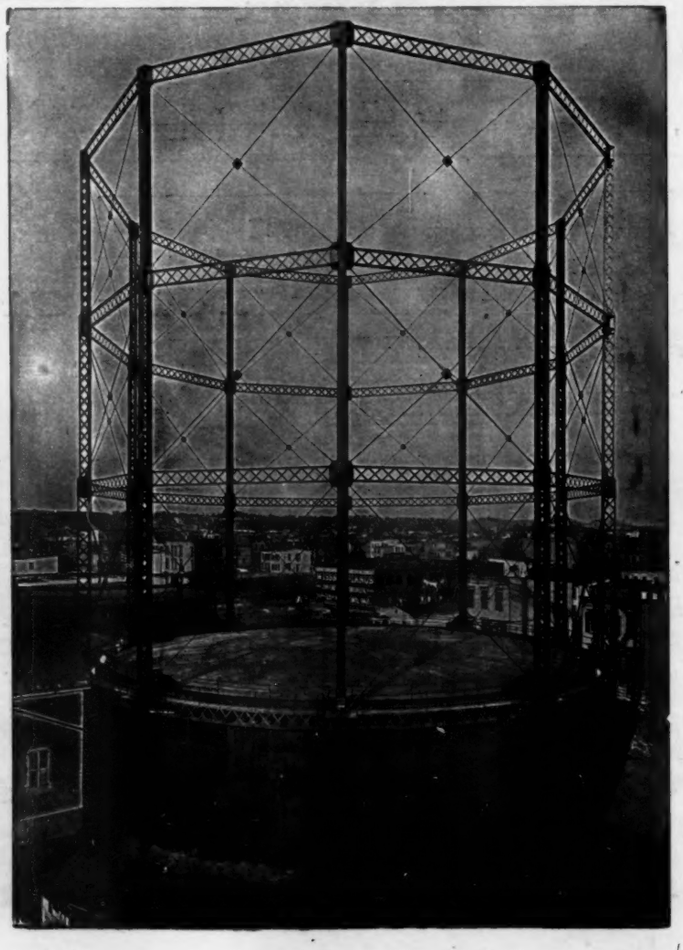

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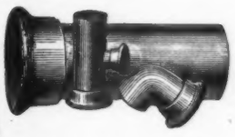

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MANUFACTURERS OF
WET AND DRY METERS, STATION METERS AND METER PROVERS.
—ALSO MAKERS OF
THE GLOVER PREPAYMENT METER.

The amount of gas delivered for the coin can be instantly and positively changed without removing the meter or replacing any parts.

The gas registered agrees absolutely with the amount purchased by the coin.

WE HAVE MADE AND SOLD IN THE UNITED STATES
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PERFECT GAS RANGES.

In competitive tests it shows
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Efficiency, Durability, and
Saving in Repairs.

Made in four grades, with Price
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to suit any condition.
We Guarantee every Range.

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THE MARYLAND METER AND MANUFACTURING CO.

Established 1866.

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"Perfect" Gas Stoves

THE DIFFERENCE BETWEEN GOOD METERS AND THOSE WHICH ARE "PRETTY GOOD" OFTEN MEANS THOUSANDS OF DOLLARS TO A SINGLE COMPANY.

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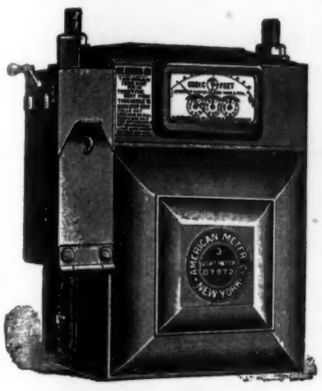

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Their construction is such that they may be readily readjusted when the scale of gas rates is changed.

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GAS METERS for NATURAL and ARTIFICIAL GAS.

Special Attention given to Repairing METERS of all Makes.

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This is the best time to look after your repairing.

Seventy per cent. of old meters run slow. You are losing money on them. Let us put them in shape for you, a few at a time, until your entire meter equipment is made as good as new. It is better to attend to this matter now, before the Gas Stove season is at its height. Probably we can do such work in our factory better and cheaper than you can do it at home, and just now we can do it promptly.

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